THE ELEVENTH YEARBOOK

OF THE

NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

PART II

AGRICULTURAL EDUCATION IN SECONDARY SCHOOLS

THIS YEARBOOK WILL BE DISCUSSED AT THE ST. LOUIS MEETING OF THE NATIONAL SOCIETY, MONDAY, FEBRUARY 26 1912, 8:00 P. M.

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BY

A. C. MONAHAN, R. W. STIMSON, D. J. CROSBY, W. H. FRENCH, H. F. BUTTON, F. R. CRANE, W. R. HART, G. F. WARREN

Edited by S. CHESTER PARKER, *Secretary*

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PREFACE

This yearbook is planned to include accounts of what is actually being done in secondary agricultural education in various parts of the United States. The program represents an analysis of the typical experiments that are being undertaken, with some interpretation of each plan and its results. The contributors of the articles are specialists who are in intimate touch with the special phases of the work which they describe. To these men the National Society is indebted for their assistance and co-operation. The editor desires to express his special appreciation of the assistance of Mr. D. J. Crosby, of the United States Department of Agriculture, who organized the program and upon the urgent invitation of the editor agreed to prepare the third paper of the volume.

I. TRAINING OF TEACHERS FOR SECONDARY COURSES IN AGRICULTURE

A. C. MONAHAN
Specialist in Agricultural Education, U.S. Bureau of Education

Some idea of the present demand for instructors qualified to teach agriculture in secondary schools may be derived from the fact that in the United States at present there are over a hundred special agricultural schools located in 17 different states supported in whole or in part by the states, and that agriculture was taught in 1910, as a separate subject in more or less complete courses, to over 37,000 pupils in 1,800 public and 140 private high schools, according to the reports submitted by these schools to the Bureau of Education. It is true that much of the instruction given in these schools is very elementary and is of an informational rather than a practical character. It is true also that the courses given are very brief in the majority of cases. On the other hand there are fully as many high schools giving four-year courses as there are special agricultural schools and the courses given by them are as vocational in their character as the courses given by the majority of the special schools. California, for instance, has 12 high schools with agricultural departments in charge of special agricultural teachers. All of these schools are supplied with land for instructional purposes varying from 3 to 27 acres in extent; all have available laboratories and several have greenhouses. Michigan has 11 high schools with four-year courses in agriculture, each taught by a graduate of the Michigan Agricultural College. Massachusetts, New York, Nebraska, Iowa, Ohio, Minnesota, Tennessee, and Vermont each has several such schools. One or more may be found in almost every state in the Union.

Of the special agricultural schools and the 2,000 public and private high schools teaching agriculture, only a very few besides the institutions giving four-year courses in the subject have instructors with a college or normal-school training in scientific agriculture, and a large percentage of the active teachers with such training have had no training in psychology or pedagogy. Probably no one factor has had greater influence in retarding the introduction of substantial courses in agriculture in all

high schools whose pupils are drawn in large numbers from farming districts than the shortage of properly qualified teachers. The demand for such teachers is indicated by the numerous inquiries received by the Bureau of Education for information concerning where men may be found qualified to teach agriculture in elementary and secondary schools. President B. I. Wheeler, of the University of California, in a recent letter to the Bureau, writes: "The demand for male teachers in the elementary schools of California is unprecedented. There has come at one and the same time a general desire for well-equipped teachers of science and the additional demand for men particularly equipped in agriculture." President J. A. Widtsoe, of the Agricultural College of Utah, says: "Up to the present a large majority of the graduates of this institution have gone out as teachers of agriculture, home economics, mechanic arts, and related subjects." President J. H. Worst, of North Dakota College of Agriculture, writes: "The demand for such teachers is far and away beyond our ability to supply. This, for the reason that the high schools generally of Minnesota and many in North Dakota are incorporating fairly strong courses in agriculture in the high schools."

It will be several years before the supply of men available as instructors in agriculture will be sufficient to fill the demand. Although the salaries paid are from 50 to 100 per cent higher than paid for instructors in other subjects in secondary schools, the state colleges of agriculture are finding difficulty in persuading men to qualify specially for teaching, because even these salaries are not equal to those paid in the agricultural industries to the graduates of these institutions. It is important, however, that properly trained men be obtained. Agriculture as a high-school science has not yet been developed into good pedagogical form and until such development has taken place a higher grade teacher is needed for the agricultural subjects than for any other subject in the high-school curriculum.

Men for this work need a liberal education in the general cultural subjects, and special training: first, in the physical and natural sciences, particularly in their relation to the science and art of agriculture; second, in technical and practical agriculture and farm practice; third, in rural sociology and agricultural economics; fourth, in general psychology and pedagogy; fifth, in special agricultural pedagogy including the history of agricultural and industrial education, the place and purpose of agriculture in the high school, the function of the agricultural high school,

special methods of teaching agriculture, and other similar aspects of agricultural teaching. The opportunity for such preparation is offered by several of the state colleges of agriculture; the opportunity for a part of such preparation is offered by a large number of these institutions.

There is in each state and territory one college of agriculture and mechanic arts, established under the provisions of the act of Congress of July 2, 1862, commonly known as the Land Grant Act, because by it there was granted to each state a quantity of public land equal to 30,000 acres for each senator and representative in Congress, the moneys derived from the sale of which have formed perpetual endowment funds, the income being used for the support of these institutions. Further aid was provided them by the acts of Congress of August 30, 1890, and March 4, 1907, so that now each state receives from the federal government, not including the income from the act of 1862, an annual appropriation of $50,000 exclusive of the money paid for agricultural experiment stations. In 17 southern states separate institutions for Negroes have been established and the federal appropriation is divided between the colleges for white students and these institutions.

While the agricultural work of these colleges, until the year 1907, was along technical lines almost exclusively, many of their graduates have become special teachers of agriculture in secondary schools with no other training than their technical agricultural courses and the other subjects in their general college course. More recently has come the demand for men trained specially for teaching, and it was largely in response to this demand that Congress in 1907, in the act for the benefit of state colleges of agriculture and mechanic arts, included the proviso that part of the money "may be used for the special preparation of instructors of the elements of agriculture." This measure is known as the Nelson amendment, as it is contained in an amendment to the appropriation bill for the Department of Agriculture. Under its provisions each state is now receiving for the benefit of its college of agriculture and mechanic arts the sum of $25,000, included in the $50,000 mentioned above, all or part of which may be used for the special preparation of teachers of the elements of agriculture. It is held by the Bureau of Education, in whose hands the administration of the federal funds for these institutions is placed, that this language authorizes the expenditure of these funds for providing special courses in agricultural pedagogy but not in general pedagogy.

As a result of the measure 36 of the 50 agricultural colleges, not including the separate institutions for the colored race, now offer some opportunities to their students to fit themselves as special teachers of agriculture for secondary-school work. Twelve institutions offer only certain courses in general education elective to students in agriculture, 14 offer courses in general education and special courses in agricultural education, 1 offers courses in agricultural education only, 7 that have departments of education allow students in these departments to elect courses in agriculture, 9 offer prescribed four-year courses for teachers, and 3 offer special one-year courses to persons preparing to teach agriculture who have already had the equivalent of the general college education. Several others will accept properly qualified persons as special students. The accompanying table gives a list of the state agricultural colleges that are offering special opportunities for preparing teachers of secondary-school agriculture and indicates which plan is followed by each institution.

A description of the special features of the pedagogical training for teachers of agriculture in all of the land-grant colleges cannot be given here. Enough, however, are included to illustrate the character of the courses offered. The institutions selected are from widely distributed parts of the country and include examples of several different methods of arrangement of this special work. The courses and arrangement of the work in the other institutions are for the most part similar to the ones described here. A statement prepared by the writer regarding the work of each land-grant college in the preparation of teachers is given in the chapter on agricultural education in the *Report of the Commissioner of Education*, for 1911.

The University of California recommends for the state teachers' certificates as special teachers of agriculture only students who have completed in their college course 12 semester-hours work in education and at least 27 hours in agriculture and agricultural education. The term semester-hour is used here and in following statements to mean one hour per week for one semester or half-year; a 4 semester-hour course therefore is the equivalent of 4 recitations a week for a semester. Seven distinct courses in agricultural education are offered, two of which only are arranged especially for students preparing for high-school work. "Agriculture in Secondary Schools" is a two-hour course and treats of the

STATE AGRICULTURAL COLLEGES OFFERING SPECIAL OPPORTUNITIES FOR PREPARING TEACHERS OF SECONDARY-SCHOOL AGRICULTURE

	Agricultural Students May Elect Courses in General Education	Education Students May Elect Courses in Agriculture	Special Elective Courses Offered in Agricultural Pedagogy	Prescribed Four-Year Course Offered for Teachers of Agriculture	Special One-Year Course for College Graduates Preparing to Teach Agriculture
Alabama Polytechnic Institute, Auburn, Ala.	..	..	×	..	..
University of Arkansas, Fayetteville, Ark.	×	..	..	..	..
University of California, Berkeley, Cal.	×	×	×	..	..
Colorado Agricultural College, Fort Collins, Colo.	×	..	..	..	..
University of Florida, Gainesville, Fla.	..	..	..	×	..
Georgia State College of Agriculture, Athens, Ga.	×	..	..	..	..
University of Idaho, Moscow, Idaho	×	..	×	..	..
University of Illinois, Urbana, Ill.	×	..	×	×	..
Purdue University, Lafayette, Ind.	×	..	..	..	..
Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa	×	..	×	×	..
Kansas State Agricultural College, Manhattan, Kan.	×	×	..	..	×
State University, Lexington, Ky.	..	..	..	..	..
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.	..	×	..	..	..
University of Maine, Orono, Me.	×	..	..	×	×
Massachusetts Agricultural College, Amherst, Mass.	×	..	×	..	..
Michigan Agricultural College, East Lansing, Mich.	×	..	×	..	×
University of Minnesota, Minneapolis, Minn.	×	..	×	..	..
Mississippi Agricultural and Mechanical College, Agricultural College, Miss.	..	..	×	×	..
University of Missouri, Columbia, Mo.	×	..	×	..	..
University of Nebraska, Lincoln, Neb.	×	..	×	..	..

STATE AGRICULTURAL COLLEGES OFFERING SPECIAL OPPORTUNITIES FOR PREPARING TEACHERS OF SECONDARY-SCHOOL AGRICULTURE—*Continued*

	Agricultural Students May Elect Courses in General Education	Education Students May Elect Courses in Agriculture	Special Elective Courses Offered in Agricultural Pedagogy	Prescribed Four-Year Course Offered for Teachers of Agriculture	Special One-Year Course for College Graduates Preparing to Teach Agriculture
University of Nevada, Reno, Nev.	×	..	..	..	..
Rutgers College, New Brunswick, N.J.	×	..	..	..	..
New Mexico College of Agriculture and Mechanic Arts, Agricultural College, N.Mex.	×	..	..	..	..
Cornell University, Ithaca, N.Y.	×	..	..	×*	..
North Dakota Agricultural College, Agricultural College, N.Dak.	×	×	..	×	..
Ohio State University, Columbus, Ohio	..	×	×	..	..
Oklahoma Agricultural and Mechanical College, Stillwater, Okla.	×	..	..	..	..
Oregon Agricultural College, Corvallis, Ore.	×	..	×	..	..
Pennsylvania State College, State College, Pa.	×	..	..	..	..
Rhode Island State College, Kingston, R.I.	..	..	..	×	..
South Dakota College of Agriculture and Mechanic Arts, Brookings, S.Dak.	×	..	..	..	..
University of Tennessee, Knoxville, Tenn.	×	..	..	×	..
University of Vermont and State Agricultural College, Burlington, Vt.	..	..	..	×	..
State College of Washington, Pullman, Wash.	×	..	×	..	..
West Virginia University, Morgantown, W.Va.	×	..	×	..	..
University of Wisconsin, Madison, Wis.	×	×	×	..	..
University of Wyoming, Laramie, Wyo.	×	..	..	..	..

* Two-year course in nature-study and agriculture.

aims, organization, and methods of agriculture as a high-school subject; "The Practice of Teaching Agriculture" is a graduate course and includes lectures, readings, and conferences, together with school observation and

practice of teaching. A course in the history of agriculture and two courses in farm management, including some work in rural economy, are given in the agricultural college and are recommended especially for students preparing for teaching. The twelve hours in education include the history of education, the principles of secondary education, either educational methods or school management, and the practice of teaching, a graduate course taken in connection with the course in the practice of teaching agriculture.

The University of Illinois, while allowing agricultural students to elect courses in the department of education, offers also a four-year prescribed course for prospective teachers of agriculture which includes 61 hours agriculture, 31 hours allied sciences, 17 hours general cultural subjects, 6 hours in agricultural education, and 8 hours in general education. The work is divided as follows, the figures indicating the number of hours devoted to the subjects:

Agronomy	21	Entomology	$2\frac{1}{2}$
Animal husbandry	$16\frac{1}{2}$	Zoölogy	5
Dairy husbandry	8	English	4
Horticulture	$15\frac{1}{2}$	Rhetoric	9
Secondary-school agriculture	6	Economics	2
Thremmatology	$2\frac{1}{2}$	Education	8
Botany	6	Library science	2
Chemistry	15		

The course in secondary-school agriculture consists of a study of the features of agricultural science best adapted to high-school conditions; the best order and methods for their presentation; suiting the course and instruction to the special interests and needs of each school community; and the planning and execution of laboratory and field work. The courses in education include "the principles of education" and "the principles of secondary education." The essential difference between this course and that offered by the University of California is in the amount of technical agriculture required, the Illinois institution requiring 61 hours work against 25 in California. Illinois gives 6 hours work in secondary-school agriculture, California 2 hours, while in general education Illinois gives only 8 and California 12. It should be noted, however, that part of the required work for the teacher's certificate at the University of California is graduate work, while the courses listed above given at the University of Illinois are all undergraduate.

The University of Maine also offers a four-year prescribed course which includes 50 semester-hours of agriculture, 11 hours education, and 89 hours English, mathematics, sciences, and free electives. The course in education includes 6 hours in the history of education, 3 in the foundations of education, and 2 in child-study. The work in agriculture is all in the last three years of the course and includes agronomy, animal industry, horticulture, forestry, farm management, veterinary science, agricultural chemistry, and bacteriology. The amount of technical agriculture coincides more nearly with that given by the University of Illinois, but at the University of Maine no courses are given to bridge the gap between these courses and the professional courses in education, as is done at the University of Illinois and at the University of California. In other words, the student who has completed the course at the Maine institution must work out his own agricultural pedagogy and methods of teaching.

A better plan is followed by the Massachusetts Agricultural College, where a department of agricultural education was organized by direction of the state legislature in 1907, just before the passage of the Nelson amendment by Congress. The department has but one sort of students to deal with, those preparing to become special teachers of agriculture; therefore it can devote its entire energy to the special needs of these men. Six courses are given by the department, all open as junior and senior electives: general psychology, 3 semester-hours; history and philosophy of vocational education, 3 hours; general methods of teaching and special methods in agriculture, 2 hours; teachers' agriculture, 3 hours; seminar in education, 4 hours. The teachers' agriculture consists of a selection and review of such parts of the technical courses in agriculture, horticulture, and the biological and physical sciences as are adapted to the work of the public schools; the seminar in education is arranged for the special study of such topics as legislation and agricultural education, and the place and value of agricultural science in school courses. A department of rural social science gives 22 semester-hours elective work of special value to men preparing to teach in rural communities: agricultural industries and resources, historical and comparative agriculture, cooperation in agriculture, agricultural economics, and rural sociology. The prospective teacher entering this college takes the prescribed course for the first two years in common with all other students. This includes 10 hours in elementary agriculture and horticulture, 20 hours in physical

and natural sciences, 12 hours in English, 10 hours in mathematics, and 14 hours in French or German. In the last two years 3 hours are required in English and in political science. The student preparing to teach must take all courses in education and electives enough to make at least 17 hours of work each semester. The electives must be taken largely from courses in agriculture, horticulture, forestry, and the closely allied sciences, and from the courses in the rural social sciences. The graduate of this department has had therefore in his four-year course 42 hours in general cultural subjects, 20 hours in physical and natural sciences, 15 hours in agricultural education, and 67 hours electives chosen from courses in technical agriculture, horticulture and forestry, the physical and natural sciences, and the rural social sciences. As the institution is an agricultural college with no mechanic arts college or liberal arts college included, all courses offered are taught from the agricultural viewpoint and closely correlated with the technical work in agriculture.

A prescribed four-year course is offered in the School of Education of the University of Tennessee. The course includes even less agriculture than the University of California, 18 hours of work only being prescribed. This includes courses in agronomy, horticulture, animal husbandry, and dairying. Fifteen hours of work is required in education, the courses including psychology and philosophy, the history of education, and the science and art of teaching. In addition to this arrangement students in the regular agricultural course may elect a few courses in education in their Junior and Senior years.

The University of Missouri was one of the first of the land-grant colleges to make special provisions for men desiring to fit themselves for teaching agriculture. Now provision is made for those intending to become general-science teachers with a small amount of training in agriculture, and for those intending to prepare as special teachers of agriculture. The students in the first of these classes take all their professional work including agriculture in the School of Education; those in the second class take their technical courses in agriculture in the Agricultural College and their professional work in education in the School of Education. The School of Education offers three agricultural courses elective to all students preparing to teach. The "Administration of Agricultural Education" is a course dealing largely with the modern movements and methods in agricultural education from the standpoint of the superintendent of schools. No work in agriculture is a prerequisite. "Soils and Plant Culture," and "Animal Husbandry" are two

courses covering the fundamental principles of these subjects and are arranged for prospective teachers who have had no other courses in agriculture. To secure a life certificate as a special teacher of agriculture candidates must include in their four years' work, in addition to the required subjects in the School of Education, a minimum requirement of 15 hours in agronomy, animal husbandry, and horticulture from courses offered in the Agricultural College for the Bachelor's degree.

Mississippi Agricultural and Mechanical College has organized a "School of Industrial Education" which offers a special four-year course leading to the Bachelor's degree in preparation for teaching agriculture or the mechanic arts. Students receive instruction in the languages, mathematics, history and civics, chemistry, physics, biology, geology, psychology, history of education, logic, ethics, sociology, besides technical courses in agriculture given in the department of agriculture. A course called "A Study of the Agricultural High School" is offered for advanced seniors and graduate students. This course attempts to give the student a true conception of the kind of education the agricultural high school is intended to provide, and a full understanding of the service it is to render the community at large. It attempts also to give the student a practical knowledge of the most approved methods of scientific agriculture. A model farm connected with the School of Industrial Education is conducted to illustrate the proper function of the agricultural high-school farm. The institution is developing a one-year postgraduate course which will include work in general and agricultural eduation designed to fit its students for filling positions as principals of agricultural high schools. The study of the agricultural high school will be continued, and the men will be given practical work on the "model agricultural high-school farm" and practical teaching in the working boys' course offered by the college. This additional year's work is very desirable for men intending to teach, because the college is obliged to accept in its undergraduate courses a large number of men who have not had the advantage of a complete high-school course.

Several of the land-grant colleges have made provisions for prospective teachers of agriculture properly qualified in other respects to become special students in agriculture or agricultural education. The Michigan Agricultural College allows graduates of other recognized colleges and of state normal schools who have had at least two years' experience in teaching to select technical courses in agriculture, entering with regular

classes and taking the subjects in the same manner and at the same time as the regular students. The courses selected may be from those given in any year of the college course, but must be approved by the classifying officer. A similar opportunity is offered by the Kansas Agricultural College. The University of Maine offers a prescribed one-year course open to college graduates, high-school teachers with at least two years' experience, and normal-school graduates who have taught at least three years. The course includes agricultural botany, 2 hours; agricultural chemistry, 4 hours; agricultural economics, 2 hours; elementary veterinary science, 5 hours; economic entomology, 2 hours; bacteriology, 1 hour; agriculture, 34 hours; horticulture, 15 hours; forestry, 2 hours; school gardening, 1 hour; and education, 2 hours.

The work in agriculture in the normal schools is intended in all but a few cases as preparation for the required work in the elementary schools. Agriculture is a required subject in the common schools of 12 states, and in the rural schools of 5 others, and is required for teachers' certificates in 14 states. This has forced it into the curriculum of the normal schools of the states where the subject is required and has aided in its inclusion in the curriculum of normal schools in other states. During the past year agriculture as a separate subject, in more or less complete form, was taught in 104 state normal schools and in the 24 county training schools of Wisconsin. Many of these institutions have graduates of agricultural colleges for instructors in agriculture. The majority offer brief courses extending from 4 to 12 weeks. Many offer a full year's course and a few a course of greater extent.

The State Normal School at North Adams, Mass., offers a three-year course in agriculture as well as shorter courses in school and home gardening, agriculture, horticulture, and nature-study. The work is arranged and conducted with the co-operation of the State Agricultural College, which has for the past three years added to the faculty of the normal school an instructor and supervisor who has given a portion of his time to instruction at the normal school and to supervision at its three training schools, a second portion to the promotion of elementary agriculture and nature-study in the schools of Berkshire County, in which the normal school is located, and the remainder to instruction at the college in agricultural education. The three-year agricultural course includes all of the work in English, psychology, and pedagogy included in the regular two-year normal course. A graduate of the regular normal course, or a

college graduate, may take the agricultural work given in the three-year course in one year. The work is intended to prepare special teachers of agriculture for supervisory work or for teaching in secondary schools. It includes the following courses:

I. AGRICULTURE—Soils. Plant life, structures, functions, and diseases. Fertilizers, tillage, crops. Hotbeds, cold frames, and greenhouses. Farm live stock, poultry, bees. Dairying.

Horticulture—Flower and shrub gardens. Window gardens. Propagation, pruning, and cultivation. Orchards and small fruits. Forestry.

Insects and birds—Economic importance. Control of injurious insects.

Farm buildings and machinery.

Sanitary science.

(Agricultural physics and chemistry involved in preceding topics.)

Rural social science.

II. NATURE-STUDY—Its content and relation to science, literature, and vocational work.

III. MANUAL TRAINING—Carpentry, cabinet work, forge work, assembling farm machinery.

Drawing—Free-hand and mechanical, structural and decorative design, use of color, farm and building plans.

IV. ENGLISH, etc.

V. PEDAGOGY AND PSYCHOLOGY.

The Fourth District State Normal School at Springfield, Mo., offers two elementary courses and one advanced course. The elementary courses together extend through five terms five hours a week, and include a study of plant life, soils and soil fertility, farm crops, grain judging, enemies and diseases of plants and their control, crop rotation, feeds and feeding, live stock, poultry, dairying, and general farm management. The advanced course is a two-year course and includes one term's work in each of the following: dairying, animal husbandry, orcharding, farm management, poultry raising, and gardening. The institution has established a two-year agricultural high school in which the students devote one-fourth of the time to agriculture or domestic science, and one-eighth of the time to pedagogy as applied to rural-school teaching. The course is intended to prepare young men and women for rural-school work, and graduates will receive a state teacher's certificate to teach in rural schools. The institution owns a model farm and good equipment for agricultural instruction. The instructor in agriculture is a man trained especially for teaching that subject.

The State Teachers College of Colorado, at Greeley, maintains a department of agricultural education offering nine courses. The work is arranged especially for rural teachers, and a special diploma in elementary agriculture is given to students completing the course. The institution is equipped with a farm, nursery, gardens, greenhouse, and stables. The instructor is a graduate of an agricultural college. The courses given by the department are as follows, each being a sixty-hour course: Nature-study; elementary agriculture; school gardening; soils and crops of the farm; animals of the farm; dairy industry and poultry husbandry; horticulture on the farm; the farm home; and rural sociology and the rural school.

Among separate institutions for the colored race two are offering excellent opportunities to prepare for teaching agriculture in secondary schools—Hampton Normal and Agricultural Institute at Hampton, Va., and Tuskegee Normal and Industrial Institute at Tuskegee, Ala. The Hampton Institute offers a three-year vocational course in agriculture and a special one-year course to students who have completed the vocational course and are preparing to teach agriculture. The one-year course includes the chemistry of soils, manures, and fertilizers; chemistry of dairy products; fermentation; milk testing; geology in its relation to soil formation; biology in its relation to plant and animal life; farm engineering, including a study of farm machinery and structures; and farm physics, including soil physics, the relation of the atmosphere to agriculture, climatology, and the organic life in the soil and air. Students taking this course are required to take also the teaching course in the training school where they are required to teach classes in agriculture under a critic teacher. Upon the completion of both courses they receive a special diploma.

At Tuskegee students in the agricultural department preparing to teach may elect a Junior year course in elementary psychology in its relation to teaching and a Senior course in the history of education and methods of teaching. These courses in education may be taken as post-graduate work by students who have completed the undergraduate work at Tuskegee or its equivalent elsewhere.

II. THE VOCATIONAL AGRICULTURAL SCHOOL

WITH SPECIAL EMPHASIS ON PART-TIME WORK IN AGRICULTURE

R. W. STIMSON
Agent for Agricultural Education, Board of Education of Massachusetts

DEFINITIONS

Within a year or two noteworthy attempts have been made to define vocational education. Vocational education, in the usage of the state of Massachusetts, includes all forms of specialized education, the controlling purposes of which are to fit for useful occupations. Agricultural education, as a phase of this subject, means that form of vocational education which fits for the occupations connected with the tillage of the soil, the care of domestic animals, forestry, and other wage-earning or productive work on the farm.

The National Society for the Promotion of Industrial Education, at its last annual meeting, adopted the report of a sub-committee which had been directed to give careful consideration to Senate Bill No. 3, now pending in the Senate of the United states, introduced by Senator Page, of Vermont, and to a similar antecedent measure known as the Davis-Dolliver Bill. That committee reported favorably on the general proposition of federal aid for vocational education, including agricultural, and in order that its recommendations might be put in the most constructive form, the committee drafted, by way of suggestion, a measure which seemed to it to incorporate the principles which should prevail in the promotion of vocational education with federal aid. In the measure drafted, sec. 1, under the heading, "Construction," includes the definitions of vocational education and agricultural education above given.

We have, then, something like a general agreement by those who are advocates of vocational education throughout the country, in favor of the definitions above given; and in this particular portion

of the symposium on secondary agricultural education it will be understood that the above definitions are adopted.

It is understood, further, that in this division of the symposium, congressional district schools, county schools, and state schools in undivided districts should be discussed. It has been suggested, moreover, that perhaps the most vital problem in the whole movement at present is the problem of making agricultural instruction really vocational, and that therefore the major portion of this part of the symposium would perhaps better be devoted to discussing ways and means of making agricultural education vocational.

SOURCES OF INFORMATION

A study of legislation upon industrial education in the United States, including agricultural, is now available in *Bulletin No. 12* of the National Society for the Promotion of Industrial Education. The *Report of the Michigan State Commission on Industrial and Agricultural Education*, December, 1910, contains a report of the sub-committee on rural and agricultural education, pp. 18 to 32, in which are discussed the state secondary school of agriculture, the congressional district secondary school of agriculture, and the county school of agriculture, the discussion being based on a careful study of representative institutions of these several types, and supplemented by appendices giving statistics and typical courses of study of these several types of schools. It is understood that this report may be had by members of the National Society for the Study of Education.

Of the congressional district agricultural schools, those of Georgia may, perhaps, be taken as representing an approved type. Two reports of those schools have been published as bulletins of the University of Georgia, and doubtless may be had by members of the Society.

The county schools of agriculture and domestic economy in Wisconsin form the subject of *Bulletin No. 242*, Office of Experiment Stations, United States Department of Agriculture. This bulletin was issued November 9, 1911, and was prepared by Mr. A. A. Johnson, principal of the La Crosse County School of Agriculture and Domestic Economy, and recently appointed superintendent of the new Milwaukee School of Agriculture and Domestic Economy. This bulletin, of course, is available for general distribution. It gives particulars regarding all of the Wisconsin county schools, including statistics,

courses of study, half-tone illustrations, and the Wisconsin law providing for the establishment and maintenance of the schools. It appears to be needless, therefore, to repeat in the brief compass allowed in this paper facts and figures so readily available in the publications above referred to.

The committee in charge of arranging the program of the symposium intended that the discussion of state schools in undivided districts should have reference to such agricultural schools as the three in New York and those in Massachusetts, California, and Minnesota. Though not originally parts of state systems of agricultural schools, they might become such if systems should eventually be established. The United States Department of Agriculture, in its *Circular No. 97* of the Office of Experiment Stations, issued May 23, 1910, gave a complete list of the institutions in the United States giving instruction in agriculture. There is great diversity in equipment and methods among the state schools in undivided districts. An attempt has been made to secure literature, descriptive of these schools, from each. Some personal visits have been paid and information from those who have visited the schools has been sought.

It is announced that the chapter on agricultural education from the annual report of the United States Commissioner of Education for 1911 will be ready for distribution about December 1, with contents as follows: a digest of important legislation in the various states during the past year; a complete summary of the status of instruction in elementary and secondary agriculture in each state; a description of some types of secondary agricultural schools; and a summary of the work of the state agricultural colleges in preparing special teachers of agriculture for secondary schools.

The Yearbook of the United States Department of Agriculture has for a number of years contained reports prepared by Mr. D. J. Crosby, Specialist in Agricultural Education, of progress in the establishment of secondary agricultural schools, their equipment, their work, and their control and support.

CONGRESSIONAL DISTRICT AGRICULTURAL SCHOOLS

On the whole, perhaps we cannot do better than to accept the Georgia schools as good representatives of the congressional district type. The Georgia schools were manifestly intended to be strictly vocational.

The schools are made, by the act providing for their establishment and maintenance, branches of the State College of Agriculture, a department of the University of Georgia, but judging by standards of certain other states, the university has been required by the law rather to adjust itself to these schools than to require the schools to adjust themselves to it.

A very practical course of study is provided, and is made uniform, in general, for all the schools. It is essentially an English, scientific, and practical course. From it all other languages than English are omitted. The report of a committee which suggested foreign languages as optional studies was rejected. The law distinctly states that—

> The course of study in state schools shall be confined to the elementary branches of an English education, and practical treatises or lectures on agriculture in all its branches and the mechanic arts, and such other studies as will enable students completing the courses to enter the Freshman class of the State College of Agriculture on certificate of the principal.

The regulations of the schools provide that the school days be so arranged as to assure at least three hours a day of classroom work in agriculture and related sciences, in mathematics and history, and at least three hours a day on the farm or in the laboratory or shop, the hours in actual farm work to be regulated by the exigencies of the farm; the program being such as to provide for the alternation of work and study among the classes morning and afternoon, thereby securing continuous operation of the farm and the shop. Each school was required to have at least 200 acres of land.

It was provided that an account of all receipts from the sale of products of the farm or shop, which were not consumed, should be kept, and one-half of said receipts for each year should be set aside as a fund to pay the students. It was further provided that

> each pupil, having performed to the satisfaction of the principal, his duties for an entire school year, receive his pro rata of the said fund, the amount going to each pupil not to exceed $100, and the balance, if any, to be placed in the general fund of the school.

One of the most important sections of the act provides that

> after the first buildings are erected, before the opening of such schools, which shall be only such as are absolutely necessary for temporary use, all work on, in, and about said schools, or on the farm, or on or in the barns or shops connected

with said schools, whether it be farming, building, care of stock, or work of different kind, shall be performed exclusively by the students of said schools, under such regulations for the proper division and alternations in such work as may be provided by the trustees.

The trustees, in ruling under the above act, have even gone so far in providing for the attendance of older men as to decree that "no one shall be allowed to enter who does not take the required practical work; if only literary work is desired, they should go elsewhere."

The fifth section proposed for the control of these schools suggests the way by which the regulation that work on the farm shall be done by the students may be carried out, viz., that

One-fourth of the students, or such number as the principal may determine as necessary to continue the operation of the farm and shop, be required to remain on the farm during the vacation, and for work required during this time, the students be given fair compensation. Students of the third and fourth year may be given acre plots for individual cultivation, or small farms for supervision, the profits to be their own; the same, however, to be first applied to payment of their dormitory or other expenses.

From the above it will be seen that strong emphasis is laid in the Georgia schools upon productive work actually performed by students, and that the method is that of providing on the school premises sufficient land for enabling this productive work to be done.

The manual labor of the students is divided into two kinds: (1) Instructive labor in practicums in the laboratory, field, shop, and home under the guidance of the instructor for nine hours a week, for which no other compensation is given than the skill acquired or instruction received as in any other school. (2) The uninstructive labor for nine hours a week on the farm, in the dormitories, shop, or elsewhere for the primary benefit of the school in its maintenance, and only secondary in its instructive benefit and not necessarily under the instructor. The latter is credited on boarding expenses each month. Each pupil is given fifteen hours a week of classroom instruction, nine hours a week of laboratory, field, shop, and home instruction, or twenty-four hours of instruction and nine additional hours for the support of the school and incidentally of practical benefit to the pupil. Thus thirty-three hours of the pupil's time each week is assigned or a little over five hours a day in head and hand work. It is stated that this gives ample time for study and recreation.

The second annual report of the University of Georgia, November, 1911, p. 29, shows that the income from the farms varied from $395

in the ninth district to $3,716 in the first district; the total farm products for the eleven districts being $22,832. There is every indication, furthermore, that more rather than less emphasis is to be put on the actual productive farming enterprises of the students carried out on the school premises. With a proper correlation of classroom and field instruction, these schools should afford vocational agricultural training of a very high order.

The course of study in the Georgia schools extends over four years. The remark made above, that the law providing for the establishment and maintenance of these schools rather required the university to adjust itself to the schools, than the schools to adjust themselves to the university, is justified by the fact that boys without training in languages, and with only such training as is prescribed for carrying out the regulations above stated, must be admitted to the College of Agriculture. Admission, moreover, must be without examination and on certificate of the principals of the several schools.

COUNTY AGRICULTURAL SCHOOLS

Of county agricultural schools, perhaps we cannot do better than to accept those of Wisconsin as fairly representative. These schools are spoken of both in *Bulletin No. 242*, United States Department of Agriculture, Office of Experiment Stations, and in the *Report of the Commission upon the Plans for the Extension of Industrial and Agricultural Education*, Madison, Wis., 1911, as *trade schools*. The last named report, p. 122, says "these are essentially trade schools and should always be maintained as such." Foreign languages are omitted. Other significant omissions are algebra and geometry.

Bulletin No. 242 gives the following as points in common for all of the schools:

The county agricultural schools of Wisconsin are co-educational.
The course of study covers a period of two years—eight months each.
Each school receives support from the state, amounting to $4,000 a year.
All schools require for entrance that students shall have completed work equal to the eighth grade.
All schools admit students from outside their respective counties.
Institutes of various kinds are conducted at each of these schools.

Again *Bulletin No. 242* gives the following as some ways in which these schools help the farmers:

Prepare plans for farm buildings.
Make suggestions for remodeling old buildings.
Build forms for and supervise the construction of cement silos, watering troughs, and similar structures.
Test all kinds of dairy products.
Assist in the selecting of farm animals.
Plan drainage systems.
Test seeds for germination.
Test cattle for tuberculosis.
Test soils.
Recommend systems of rotation.

Half-tone illustrations show classes of students removing stumps with dynamite; raising the form for and constructing a concrete silo; operating the level; pipe fitting; forging; carpentering; road constructing with a road machine and studying various types of gasoline engines. The illustrations show the boys in overalls and evidently acting as participants in the various operations.

Each county school has some land, but repeatedly it is stated that this land is used for experimental and demonstration purposes. No emphasis is laid on the fact that no possible or actual participation is allowed the students in actual productive farm work on the school premises. Moreover, in the list of ways in which these schools help the farmers, the things done appear to be done by members of the staff and not by students in the school. Students evidently use school time for study and for observation, and dependence is placed upon the ability of the students on graduation to apply the instruction they have received in the school for their own benefit.

The Wisconsin Commission upon "Plans for the Extension of Industrial and Agricultural Education" found that the county agricultural schools "serve a class of people the country and high schools fail to reach," that "their value has been clearly and unquestionably demonstrated"; and it recommended that the limit of state aid for each be raised to $6,000 a year, "but with the provision that if more than $4,000 be paid by the state that the county shall contribute not less than an equal amount." The original limit for each had been $4,000 a year from the state.

The trade school, or distinctly vocational character of the instruction given by these schools, was further emphasized by the proposed

relationship of these schools to the university. The Commission recommended that the University of Wisconsin "establish in the College of Agriculture a 'continuation course' for graduates of county agricultural schools." Thus it is seen that the kind of training here considered is sharply differentiated as to field, content, and methods from the ordinary high, or college preparatory school, on one hand, and, on the other hand, from the training for professional service provided in the regular classes of the college of agriculture.

STATE AGRICULTURAL SCHOOLS IN UNDIVIDED DISTRICTS

In elaborateness of land, buildings, equipment, and staff a pretty sharp line can be drawn between two kinds of State Schools in states which have not yet been divided into districts for the development of vocational agricultural schools. These are (1) schools operated in connection with the state colleges of agriculture, and (2) those which are not.

At state agricultural colleges.—Without giving a complete list, it may be well to note here that vocational agricultural schools are now operated in connection with, and upon the premises of, the colleges of agriculture in Minnesota, Montana, Colorado, West Virginia, New Hampshire, and Connecticut.

In such cases the work of the school is primarily practical. It does not differ materially from that of the congressional district, or county agricultural school, in entrance requirements. The courses vary in length from six to nine months a year and from two to four years.

When the demands for vocational agricultural training are sufficiently limited so that a single school may suffice for a state, it would seem to be highly advantageous that the school should be located at the state agricultural college. Duplication of expenditure for land, buildings, and equipment would thus be avoided. The students might be trained in part by assistants, but first or last would become acquainted with, and feel at first hand the influence of, the state leaders in agricultural research and education. In most cases the agricultural college teaching staffs might be expected to adapt their school instruction to the real needs of their school students, as distinguished from their students of college grade. Certainly schools so located have stood high in the estimation of the people. President Northrup once said that there were people in Minnesota—not a

few—in whose minds the School of Agriculture stood for the whole University.

Apart from state agricultural colleges.—In other states, New York and Massachusetts among the number, it has been considered inadvisable to maintain vocational agricultural schools on the premises of, and in immediate connection with, the state colleges of agriculture. In these cases the resources of the schools are more or less limited.

The courses of these schools vary greatly in length and character. Some differ but slightly from the state agricultural colleges of earlier days. Others maintain two-year courses of six or of eight months each, from which have been omitted such subjects as algebra, geometry, and all instruction in languages excepting English. Some utilize a limited amount of land for demonstration and experimental purposes. Others provide for more or less practical farm work on the school farms.

In fact, these schools are proving to be most interesting and valuable experiment stations in methods of vocational agricultural training. Perhaps it is not too much to say that out of the very weakness of some of these schools, in land and equipment, is coming the best strength of the whole movement for a type of agricultural training which shall be genuinely vocational. That is to say, vocational efficiency at the end of a course of training appears to bear no directly proportionate relation to the comparative amounts of money invested in the school plants and their cost of operation; and, similarly, it appears to depend more on points of view and on methods among the various staffs than upon faculty numbers and salary budgets.

Productive work of a high order of efficiency is coming to be considered the real test of all systems of vocational education of secondary grade. Particularly in vocational agricultural education it is coming to be accepted that the training must be such as to develop both skill and managerial ability. The competent farmer must be, not only expert in the varied technique of his calling, but also a sound and progressive business manager.

Neither skill nor business ability can be learned from books alone, nor merely from observation of the work and management of others. Both require active participation during the learning period in productive farming operations of real economic or commercial importance. A masterful, constructive imagination may accomplish much for him who possesses it; and for his needs books and observation may finally

result in vocational efficiency. The difficulty is that such powerful imagination is so rare as to constitute him who has it a genius, far removed from the common run of boys fourteen to eighteen or twenty years of age who live on farms, who expect to follow farming for a living, and whose training is not likely to extend beyond that afforded by the vocational agricultural school.

In general, if there is a defect in the large agricultural schools which boys must leave home in large numbers to attend, and which in order to secure adequate attendance to justify their cost must, apparently, limit their training to six or eight fall and winter months, it is the defect of putting too great reliance upon books and observation, to the exclusion during the intensive learning periods of active participation in the type, or types, of productive farming the boys intend to follow after graduation. Too great, one may almost say in the cases of many of the boys, fatal reliance is put on the ability of the students, once well grounded in sound theory, to put that theory into successful practice on their own farms, alone and unaided.

Even if the large school undertook to put its plant and equipment to the strictest possible productive farming uses of a profitable commercial character, and to induct its students into its aims and to school them in its methods, its efforts would be more than likely to break down through sheer weight of numbers. School farms at present can hardly be claimed to be thoroughgoing commercial farming concerns. The most flattering school photographs, where the aims of the school are most emphatically practical, show by far too few actual participants, by far too many spectators. To see the thing done, however good the demonstration, is not to do it one's self. To participate in the carrying out of an enterprise planned and ordered by another, by even an agricultural school instructor, may leave one little better than a gang-laborer. The pittance paid per hour, where any pay at all is given, can hardly, as an incentive to keen interest and alert action, be considered comparable to the reward the student might hope to realize from an independent enterprise planned and executed by himself and wholly for his own profit or that of his family. It must be feared that, however excellent may be its work in piecemeal demonstrations and in certain really valuable experiments, school farming must from a strictly commercial point of view always remain more or less artificial.

Perhaps the best use to which an agricultural school, large or small, can put its own land and equipment is that of demonstration and experiment. Most schools appear to have adopted this view. It is not clear, however, that any considerable number have adopted methods of training calculated to overcome their defects as agencies for graduating students thoroughly trained in the practice as well as in the theory of profitable farming.

Most of the schools are far from confining their activities to their own premises and regular school classes. What may be done, supplementary to the usual school work, has been admirably set forth by Messrs. D. J. Crosby and B. H. Crocheron in *Separate No. 527*, from the yearbook of the United States Department of Agriculture for 1910, under the title "Community Work in the Rural High School." Suffice it, for our present purpose, to say that these outside efforts are directly planned for the benefit of adults, for persons not in school.

The problem, then, of providing for actual participation, both as manager and as worker, in productive farming, simultaneously with his classroom instruction, on the part of the boy in the agricultural school, may fairly be looked upon as the most startling and stupendous problem in this great field of vocational education. How shall it be solved?

Georgia has attempted its solution, apparently, by requiring the officers and students of the congressional district agricultural schools to create a considerable portion of the equipment and buildings of those schools, and to improve the land and make it commercially productive; also, by proposing a method of reward for competent work, in part by payment per hour for half the labor performed, in part by a plan of profit sharing within fixed limits, and in part by the assignment to each student of an acre or more of land to be cropped for his exclusive benefit. It further proposes to require the attendance of one-fourth of the students through the entire growing and harvesting seasons. The citations from the Georgia law and proposed regulations published by the state authorities made responsible for the work of these schools, given when these schools were before discussed, show plainly the trend of vocational education in that state.

The Massachusetts plan.—Massachusetts has developed another plan for the solution of this problem. This plan was fully set forth in a report submitted to the legislature in January, 1911, by the Massa-

chusetts Board of Education. The legislature has provided state aid for carrying this plan into effect. A vocational agricultural school may be established by any town or city, or by any group of towns or cities which may voluntarily form themselves into a district for this purpose. The state has not been definitely divided into districts by the legislature—congressional district, county, or any other.

Provided an agricultural school, large or small, taught by one teacher or more, with or without school land and live-stock, with training extending over two, three, or four years, a school in general farming or in such specialized production as market gardening—provided an agricultural school is approved by the Massachusetts Board of Education as to "organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission and employment of pupils and expenditures of money," the community or voluntary district maintaining it is entitled to reimbursement from the treasury of the state to the extent of one-half the amount expended in maintaining the school from funds raised by local taxation. The state contributes nothing toward the initial cost of land, buildings, or equipment.

Since the report in which this plan was set forth is not available for distribution, the original edition having been exhausted, it has been suggested that its dominant feature should be given here. That dominant feature has been termed "Part-time Work in Agriculture."

PART-TIME WORK IN AGRICULTURE

Part-time work in agriculture is the utilization of home land, equipment, and time, outside school hours, for practical training supervised by the school. The term "part-time work" is a descriptive expression, brought over from current discussion of certain forms of industrial training, for use in unfolding the possibilities of this proposed type of training in the field of education in agriculture. Part-time work in industrial education means that the student spends part of the time required for his training in a shop or manufacturing establishment, and part of the time at the school building; both school and shop work, however, being intimately related and supplementary to each other.

Part-time work as applied to agricultural education means that the student must spend part of the time required for his education in productive farm work, preferably at home, and part of his time at the

school; the farm work and school study to be closely correlated by the school at points selected from season to season or from year to year, and to be given the highest possible educational value by competent school supervision.

Equitable.—The same causes that have brought about a widespread demand for co-operation between school and shop in industrial training make just as necessary similar co-operation between the school and the home farm in agricultural training. Historically, shop and farm at one time gave the youth all his vocational training. Of late the tendency has been, under the stress of modern conditions, to throw upon the schools almost the entire responsibility for the industrial and agricultural education of minors. It is becoming increasingly apparent that the school cannot meet this difficult and expensive burden, unaided. It therefore seems to be equitable that the schools shall bestow the related theoretical instruction which they are so well designed to give, leaving to factory and farm the task of giving, under expert direction, the practical experience which they are well equipped to confer.

Economical.—Such part-time work reduces the cost of agricultural training of secondary grade so as to place effective training for the farm within the reach of many communities which would otherwise be unable to secure it. Part-time work obviates the necessity of sending the boy away from home in order to secure the benefits of agricultural training. The cost of living for the boy is less at home than it would be at a boarding school. Parents are deprived of the services of the boy during only a portion of the day.

Effective.—Co-operative work between the school and the home farm is the most effective known means of trying out, under the conditions of individual farms over widely scattered areas, methods which have proved to be profitable elsewhere, as, for example, at a State Agricultural Experiment Station. Such co-operation furnishes the only experimental means by which each boy can try out the merits of the home farm as an agency for producing profits, when treated by the best-known methods; that is to say, part-time work furnishes the only means whereby the principles and methods taught by the school may be positively adapted by the boy to the economic conditions on the farm on which he may spend his working days. Part-time work thus gives to agricultural teaching the reality of actual life, as but little school training can give it.

It is believed, in short, that every purpose of economy in the establishment and maintenance of a system of agricultural schools, and of efficiency in the education provided, will be insured by utilization to the largest possible extent of home land, equipment, and time in the training of boys for the successful pursuit of farming.

In a state system.—Under the "part-time work" plan, developed into a system for a whole state, centers would naturally be selected. The instruction would then be adapted to the kinds of farming prevalent in the districts surrounding those centers. The practical applications of the instruction would thus be subject to the obstacles continually encountered under the economic farming conditions found in any given district; just as they would, also, be aided by all the influences in that commonwealth which make for the improvement of farming. The plan, as an educational process, is believed to possess unquestionable merit, because farming activities readily resolve themselves into what may be termed farming "projects."

PROJECT METHOD FOR PART-TIME WORK

A farming project is a thing to be done.

1. *Improvement projects.*—The thing done might contribute some element of improvement about the farm, as constructing a concrete walk leading to the front door, the planting and nurturing of shade trees, the making and maintaining of an attractive lawn.

2. *Experimental projects.*—The thing done might be of an experimental nature, as the planting of an untried variety of fruit, the feeding of an untried ration, the testing of an untried spraying mixture, or the testing of one or another of much advertised roofing materials.

3. *Productive projects.*—Finally, the thing done might be of a productive nature, as the growing of a crop of clover or alfalfa, the growing of a field of potatoes, the growing of a crop of silage corn, or the production of eggs for the market.

A farming project is, further, something to be done on a farm, which would involve a limited and definite amount of equipment, materials, and time, and which would be directed toward the accomplishment of a specified and valuable result.

1. *Improvement.*—An improvement project might be limited, for example, to a given length and width of concrete walk, constructed of

a given kind of stone, sand and cement, costing not to exceed a given sum of money, and requiring not to exceed a specified amount of time.

2. *Experimental.*—An experimental project might be limited, for example, to the planting of a given number of trees of an untried fruit, on a piece of ground which could well be spared for such a hazard, and involving a cost in time and money which it was felt could be afforded at a given time for this risk.

3. *Productive.*—A productive project might be limited, for example, to the growing of a given area of clover or alfalfa, at a given cost for seed, fertilizer, and labor, and for the securing of a specified quantity and value of feeding stuff or roughage.

Finally, a farming project, as the term is here used, is a thing to be done on a farm, which, in the preparation for doing it and in the carrying of it out to a successful result, would involve a thoroughgoing educational process.

1. *Improvement.*—The improvement project of constructing a concrete walk to the front door might involve the study of the nature of cement; its action on sand, and gravel or broken stone; its resistant qualities to the weather; the seasons at which it could be used; its cost, as compared with other materials, such as boards, plank, tar, brick, flagging, and asphalt; the mathematical determination of the proportions of cement, sand, and stone to be used; the geometrical determination of the sections into which it should be divided, and whether it should be crowned or flat; the geographical sources of the raw material; and the market conditions for purchasing cement.

2. *Experimental.*—The experimental project of planting an untried variety of fruit might involve the study of the probable adaptability of the variety selected to the soil, the climate, and the market demands within reach of the farm.

3. *Productive.*—The productive project of growing a crop of clover or alfalfa might involve the study of the various varieties of clover; the comparative adaptability of these varieties to the given field on which the crop was to be grown and to the climate of the locality; the most reliable places for the purchase of seed; the best time for seeding; the best time for cutting; the best methods of curing and storing; the mathematical calculation as to the saving in cost of feeding stuffs which the crop would afford; the chemical elements it would furnish

in the ration; and the chemical, biological, and mechanical effects on the soil in which it would be grown.

A complete definition of a "project" as here used has three elements.—Thus, it will be seen that a complete definition of a farming project as here used involves the three elements of (1) something to be done on a farm, (2) under specified conditions and for a specified valuable result, and (3) requiring a thoroughgoing training.

Project fields or classes.—There are certain broad, general fields in which numerous projects might be found. Among these are:

Vegetable gardening.	Greenhouse crops.
Flower gardening.	Production of poultry products.
Landscape gardening.	Beekeeping.
Orcharding.	Swine husbandry.
Small fruit growing.	Sheep raising.
Growing of general farm crops.	Horse raising.
Farm forestry.	Dairying.

Agricultural physics and mechanics as applied to farm buildings, drainage, irrigation, and providing and maintaining farm machinery.

Major projects.—Projects within the above general fields might be major projects. Of major projects, the following may be given as examples:

1. *Caring for the kitchen garden.*—Under the direction of the school, a boy over fourteen years of age might be required to cultivate the kitchen garden for supplying the family with vegetables or small fruit.

2. *Keeping a pen of poultry.*—Under the direction of the school, he might be required to keep a pen of, let us say, twenty-five birds, for the purpose of producing a net profit on the enterprise.

3. *Caring for a selected part of the orchard.*—Under the direction of the school, he might be required to care for a part of the home orchard, say five apple trees, so as to improve the quality of the fruit and thus gain a larger net return.

4. *Raising a specified crop of potatoes.*—Under the direction of the school, he might be required to raise on the home farm an acre, or a tenth of an acre, of potatoes, according to his age and strength, so as to secure the best possible crop and the largest possible financial return.

5. *Caring for one cow.*—Under the direction of the school, he might be required to care for at least one cow in the home herd, with a view

to securing from her the highest production of which she was capable, and to determining whether she were yielding an adequate profit.

Major and minor projects.—While the above does not constitute by any means a complete list of possible major projects, it is intended to be suggestive of the many and diversified kinds of projects that might be feasible for use in the part-time work under consideration. A major project may include a great many minor projects.

Minor projects are related to major projects as parts to the whole.—Minor projects include all the diversified activities which the boy must perform in order to bring the major project which he has undertaken to a successful conclusion.

Details of a project suitable for first- or second-year instruction.—Later in this discussion details are given of a project suitable for use with third- or fourth-year students. The subject in that case is a staple product likely to be grown on every farm, or at least in every farm garden.

At this point it may be desirable that the possible working out of the project method of instruction should be illustrated by details of a subject which would be suitable for use with students of the first or second year.

In the list of major projects above given, the second, "Keeping a Pen of Poultry," will, perhaps, best serve this purpose. This project permits of clear analysis. It is sufficiently familiar to make intelligible such technical terms as it may be necessary to use. It deals with a branch of agricultural production found on every farm and at many village homes; yet a branch from which, when conducted as a separate undertaking and on a strictly business basis, it is very difficult to make a profit. It has to do with farm products which are of very great economic importance for the advancement of agriculture in Massachusetts, at any rate; since this state, while admirably suited for poultry keeping, imports $25,000,000 of poultry and eggs annually, and produces less than $6,000,000 worth per year. (See *Agriculture of Massachusetts*, the report of the Secretary of the State Board of Agriculture, 1909, p. 119.)

Owing to the attention now being given poultry keeping by the agricultural colleges and experiment stations, materials for teaching the subject scientifically and practically are increasing, and make this one of the most promising lines of project instruction for school use.

Poultry keeping, moreover, affords one of the best projects for transition from the boy's treatment of animals as pet stock to his treatment of them as vital factors in economic agricultural production.

Important as this poultry project is, however, it will, of course, be understood that there are many other projects suitable for first- and second-year use. This project is but a single example of the many which might have been given.

Minor projects.—Suppose the major project in preparation for purposes of instruction be No. 2, above given, "Keeping a Pen of Poultry." Then certain minor projects necessary for carrying out this major project might be:

1. *The building of a poultry house* (if necessary), according to plans and specifications worked out at the schoolhouse. This minor project in turn could be broken up into a number of subordinate minor projects necessary to its successful completion, such as:

(*a*) The selection of a site for the poultry house.

(*b*) The adoption of a plan for the poultry house.

(*c*) The materials entering into the construction of the poultry house (involving kind, cost, and availability).

2. *The selection of birds*, as determined by the purpose in keeping them (whether for show stock or utility, breeding or egg producing). This minor project in turn might be broken up into a number of subordinate minor projects necessary to its successful completion, such as:

(*a*) The choice of type and breed.

(*b*) The choice of breeding stock.

(*c*) The choice of method of beginning the project.

3. *The feeding of the poultry.*—This minor project might in turn involve a number of subordinate minor projects necessary to its successful completion, such as:

(*a*) The selection of the kinds of feed.

(*b*) Working out problems of feeding.

4. *Other minor projects* within the major project of "Keeping a Pen of Poultry," which might also be analyzed into numerous subordinate minor projects, each necessary to the successful performance of the larger minor project and the major project of which it forms a part, are:

(*a*) The production of eggs for profit.

(*b*) The production of chicks by incubator.

(*c*) The care of chicks by artificial brooding.
(*d*) The rearing of chicks.
(*e*) The handling of young stock.
(*f*) The fattening and killing of poultry.
(*g*) The marketing of eggs and birds.

In like manner, every major project similar to those heretofore described, chosen by the school for purposes of instruction, might be analyzed into the minor projects of which it was composed, both in order that the various activities of the boy in the successful accomplishment of the major project might be effectively directed and supervised, and, as we shall see later on, in order that the theories and principles related to the different phases of his task might be given at the time when they would be most effective from the practical and the educational points of view.

Three factors must, it is believed, determine the measure of success in any given plan of part-time work in agriculture: (1) the farmer and his farm; (2) the school and its agricultural supervisor; (3) the boy and his projects.

1. *The farmer and his farm* must constitute the fundamental factor in the practical training of the boy. There can be little effective work in the field of part-time training for the farm without a reasonable spirit of co-operation on the part of the parent. Parents in Massachusetts are required to pledge co-operation.

There are at least three ways in which the parent can aid in making the directed farm experience of the boy most educative: (*a*) in the use of the home plant; (*b*) in the use of the home time of the pupil; (*c*) in giving the boy's projects economic importance.

(*a*) *In the use of the home plant.*—One of the most essential features of the co-operative part-time plan between home and school is that the parent shall be willing to devote from time to time in accordance with the plans of the supervisor or teacher in charge of the work, a reasonable portion of his buildings, orchards, garden, pasture, forest, and other fields, and of his implements and machines, animals and materials, to the directed training of the boy.

(*b*) *In the use of the home time of the pupil* the *fullest value* of the agricultural course comes from the fullest possible participation of the boy in the ordinary routine of farm work as usually carried out by the parent; but the greatest benefit of the school cannot be had without the use

of a part of the boy's time, during the hours spent at home, for strictly school purposes. The following are a few of many illustrations of what might be the directed use of a part of the home time of the pupils in the pursuit of projects suggested and directed by the school:

A. The boy may help with the milking throughout his course, where the object is to get the cows milked as quickly as possible, and where no records are kept. During certain months of at least one year, the school should require whatever time may be necessary for keeping an accurate record in pounds and ounces of the yield of a part of the herd. This may be limited to the weighing of milk from a single cow, and giving the cow credit for what she produces.

B. It may be part of the boy's business to assist in feeding the cows. During part of his course, sufficient time should be given for weighing the ration and charging at least one cow with what it costs to keep her.

C. In the ordinary routine to which he has been accustomed in milking, much or little attention may have been paid to cleanliness of cows, utensils, or the person and clothing of the milker. During part of his time in school, the boy should be given whatever time may be necessary for milking at least one cow and preserving her milk under absolutely sanitary conditions, and for sampling the milk for bacteriological tests.

D. In the ordinary cropping of the farm, much or little attention may have been paid to leguminous crops. But during one season at least, facilities should be given the pupil for growing a patch of moderate size of clover, and for observing the effect of introducing a large proportion of clover into the ration of the cow.

E. In the ordinary conduct of the farm, much or little attention may have been paid to the selection and testing of corn for seed. But prior to planting, one season at least, the boy should be given whatever time may be necessary for making germination tests of the corn which it is proposed to plant.

F. Also, during one season, the boy should be given control of a portion of a cornfield for making an "ear to row" corn test; for observing the difference in yield from different ears of corn—all the corn from one ear being planted in one row and all the corn from another ear being planted in another row.

G. In the ordinary routine of the farm, it may be the business of the boy to tend the poultry. During at least one year, he should be given control of at least one pen of poultry, and facilities for feeding a balanced ration and trap nesting individual birds for comparison of productivity in laying.

H. It may be part of the usual work of the boy to help cultivate and harvest the potato crop. During one season at least, he should be given facilities for testing the value of the use of formalin for the prevention of potato scab, and of the Bordeaux mixture for protection against potato blight.

(*c*) *In giving the boy's projects economic importance*, the active aid of the parent would again be almost indispensable.

A. Keeping accounts.—Whether or not the parent were in the habit of keeping books, it would be vital to the success of the school training that accurate accounts of outgo and income should be kept with regard to certain home projects directed by the school. Every boy should be taught business-like methods for carrying on work. Modern business methods provide for discovering exactly where money is made, and where it is lost, at any stage or in any part of a given enterprise.

The boy should be given opportunity for testing, under his home conditions, the value of methods which have proved efficacious in business. The school, to be effective, must teach economic production in every phase of farm life for which it gives preparation. Accounting is necessary to any intelligent comparison of the effectiveness of the method advocated by the school with that of a method previously or subsequently followed.

B. Projects as business enterprises.—If the experiences of the boy in the farming projects are to be educative to the largest degree, it is believed that they should be conducted strictly as business enterprises. Four methods of meeting the problem of the cost and profit of these directed farming operations would be possible: (*a*) the parent might meet all the cost, and give the boy all the profit; (*b*) the parent might meet all the cost, and retain all the profit; (*c*) the parent might meet all the cost, and share the profit with the boy; (*d*) the boy might receive the net profit, after the cost of the project had been paid.

From the educational point of view, the last method. by which the boy, after conducting the given project as a business enterprise, would profit only to the extent to which his total receipts exceed the total cost of the enterprise, is believed to be in every way preferable. By this method the boy would learn, once for all, through his own experience, that there can be no product without cost, and no profit without excess of receipts over all expenditures. After such an experience, he would not be likely to undertake a new enterprise without a serious attempt to estimate accurately his probable profit. The boy would be subjected

to the prevailing economic conditions under which the home farm must yield a profit, or a loss, at the end of each year of work.

The method by which a boy becomes on a small scale a farmer or a business man for himself gives the project which he is carrying on a reality not otherwise attainable, that heightens measurably his interest in the work and in the related study of the school, and must fix better than by any other device the training which he is receiving.

Incidentally, it may be remarked that, as a matter of public spirit, the citizens of the community may do much to further the objects of the school by admitting the agricultural instructor or supervisor and his students to their premises, for the examination of animals, machines, and all out-door and in-door operations, and by explanation and discussion of their methods of accounting and their improved farming processes. At another point in this discussion the possible fields of usefulness to a community of such an instructor or supervisor are pointed out.

2. *The school and its supervisor.*—Part-time work in agriculture, whether the school be large or small, requires the services of a trained and experienced agriculturist, who devotes his entire time to teaching the principles and the best methods of farming. It is believed, further, that largely through this instructor or supervisor of agriculture the school should: (*a*) choose the projects to be undertaken by the boy; (*b*) direct his work in the discharge of his projects; and (*c*) put him in possession of the principles that relate to them.

(*a*) *In the selection of the projects to be undertaken by the boy,* the instructor should take into consideration:

A. What farming enterprises are profitable, or could be made so, in the neighborhood.
B. The age of the boy.
C. The kinds of projects that would be feasible on the home farm.
D. The boy's routine farm work at home.
E. The assistance that the father could afford to give in materials and equipment.
F. The suitability of the project to the season of the year.
G. The projects and portions of projects that could best be carried out at the school, and the best time on the program of the year for these parts of the work to be done.

The problem of the building of a poultry house by the boy would be one of the possible minor projects, as before shown, when the larger

project of keeping a pen of poultry was under consideration. This problem would naturally involve such questions as these:

A. Would the student have the necessary time?
B. Could the necessary materials be provided by the parent or student?
C. How much personal supervision of the actual work of construction would be necessary or advisable on the part of the supervisor?
D. Would profitable poultry keeping on a given home farm require the improved accommodations which the model poultry house, built by the student, would furnish?
E. How far would conformity to the standards set up by the school be necessary in determining what would be a model type of poultry house for a given farm?
F. In what year of the school course should the building of a poultry house be undertaken, in order that the training in poultry keeping might be made most profitable?
G. What time of the year could the student build a poultry house to best advantage?

The problem of conducting the building of the poultry house as a strictly business enterprise is a project which would naturally involve these questions:

A. To what extent, if at all, could the boy be required to meet, or be charged with, all cost save his own labor, and be credited with a fair inventory valuation of the completed structure?
B. If the parent must advance the money or materials, what rate of interest, if any, should be charged the boy?
C. What method of accounting should be adopted?
D. Should such records be kept as would enable the cost of this building to be compared with other similar buildings in the neighborhood, as a check upon the business-like character of the boy's working out of this project?

(*b*) *In directing the work of the boy in the discharge of his projects*, the school must of necessity, it is believed, undertake the supervision of a portion of his work at home. Supervision of part-time work in agriculture is not an attempt on the part of the school to interfere with the private management of the farms of the parents. Supervision, nevertheless, is a continuous effort by the school to assist, advise, and encourage the students in applying under home conditions, farm methods which have proved successful elsewhere, and thus to cause the practical training of the students to result in vocational efficiency.

The instructor would not undertake to supervise all the details of the farm management on any given farm. Daily supervision would be impossible, because of the number of farms to which the work of the school must be extended. Excessive attention to minute details of farm work on the part of the instructor might create needless friction between himself and the parent, or might interfere materially with the supervision of a proper amount of project work. It is, therefore, not contemplated.

The school should not, it is believed, undertake to shift responsibility for the economic management of a farm from the shoulders of the parent to the shoulders of the public.

The instructor would undertake to supervise certain selected major projects and their related minor projects performed by the boy at home. In a given year and season attention might, for instance, be concentrated upon the project of keeping a pen of poultry. Having given the study related to this project, the instructor would supervise the application of that study. The following examples illustrate what the character of such supervision might be:

A. In the building of the poultry house, the actual work of putting up the structure might, or might not, be supervised by the instructor. All other elements or phases of the enterprise should be worked out by the student under the direction of the school.

B. The course in farm shop work of the school might well undertake to deal with the problem of the actual construction of the poultry house.

C. It would be the duty of the instructor or supervisor to canvass thoroughly with the student the relative merits of different types and methods of poultry keeping, from the points of view before indicated. His supervision might go the extent of passing judgment on any proposed purchase of breeding stock, chicks, or eggs.

D. The supervisor would not personally direct the daily routine work of feeding and watering poultry. His duties would consist of directing the thorough study of possible feeds and mixtures, their comparative cost and availability, and their suitability to the age, condition, and purpose of the student's particular birds. For such supervision personal knowledge by the instructor of the exact home conditions would be necessary.

The supervision of the practical home work of the boy or girl would naturally follow the settlement of such problems as these:

A. How could supervision and instruction be closely correlated?

B. How should the time of the instructor and of the pupil be apportioned between home and school duties.

C. What would be the maximum radius, from the school building as a center, of effective supervision?

D. What methods might be employed for securing and holding the co-operation of the parent and the community?

E. By what means might satisfactory standards in the practical work of the student be maintained?

Thus far we have discussed the duties and responsibilities of the special instructor or supervisor of agriculture *in the field of direction* of the boy's projects on the home farm.

The instructor might undertake to give help to others than those connected with his school. There are not wanting those who believe that such an agricultural instructor attached to a regular high school might render valuable service to the community in which he was employed, in what might be termed *the field of suggestion.* Considering the previous training and experience required of this instructor, he should be a man well prepared to be of wide assistance in a farming community as an adviser in emergencies which called for special knowledge and skill. If met by a problem with which he could not cope unaided—and there might be many such problems—he would know the best men, books, and bulletins, or where to find them, for consultation in such emergencies. Such problems might arise from attacks upon crops by injurious insects or by fungous diseases.

The friendly advice which the agricultural instructor might give need not mean a meddlesome attitude on his part. His suggestions would not be given save when requested, or when it was evident that they would be welcome.

The field of suggestion would naturally begin with farms represented in the school by students. The instructor would of course stand ready to give the parents any advice of which he might be capable, or to get for them, or instruct them how to get, any information which they might need or desire. With the gradual extension of his knowledge to the other farms of the community, he might be expected to stand ready in a similar manner to be of assistance to the owners of those farms. Such service, however, would be incidental. His main work would be with the boys enrolled in his classes.

3. *The boy and his projects* form a natural connecting link between the farmer and his farm, on one hand, and the school and its instructor, on the other. At the farm, the pupil deals with the practical aspects of

his projects; and at the school, with their scientific aspects. The foregoing discussion has been devoted chiefly to the practical aspects of the proposed project method of instruction. The present section lays strongest emphasis on the related study essential for the successful carrying out of a particular project.

Details of a project suitable for third- or fourth-year instruction.—Earlier in this paper a project was dealt with which might, for the most part, be successfully carried out by a first- or second-year student. For the present discussion a project has been selected which would require considerable maturity of age, strength, and training for its successful accomplishment. It is true that simpler problems in potato growing have been successfully carried out by elementary school pupils; but even a glance over the elements which enter into the project now to be outlined will show that problems altogether too serious to be comprehended or undertaken by the younger pupil are here involved.

It is to be understood, of course, that the following project is but one of many which might be selected.

(*a*) *Major project.*—It is assumed that the boy has chosen for his major project the development of a method for increasing the profit from the potato crop customarily grown on the home farm. It is further assumed that 5 acres of potatoes are generally grown; that this year the crop is to be grown on clover sod; that the variety of potatoes to be grown has been chosen by the father; and that the boy's father is willing that his boy shall have complete control of a given number of rows of the 5-acre field, and shall be furnished the necessary tools and materials for his project.

(*b*) *Minor projects* necessary for carrying out the above major project might then be as follows:

A. Insuring the most abundant crop by:

1. *A proper seed bed.*—The related study here would involve knowledge of:
   (*a*) Conditions of soil, air, texture, temperature, and moisture most favorable to the growth of the potato plant, including methods of reducing an undesirable amount of "free" water, of avoiding too great dilution of plant food, and of securing a desirable amount of "film" water.
   (*b*) Methods of preparing the seed bed, including the comparative advantages of fall and spring plowing, and the best treatment of the land in the spring after plowing and prior to planting.

2. *Proper fertilizing.*—The related study here would include knowledge of:
   (*a*) Chemical composition of the potato plant, its osmotic and digestive processes, and the quantity of available fertilizing materials it is capable of assimilating.
   (*b*) Complete fertilizers for the production of potatoes, including analyses of standard fertilizers, and the plant-food values for potato growing of chemicals and mixtures offered for purchase.
   (*c*) Comparative desirability of muriate and sulphate of potash for producing a crop to be disposed of in an immature state as new potatoes, or for producing a crop of late potatoes to be disposed of for winter use; and the extent to which the "mealy" character of the mature crop should be the determining factor in choosing between these two kinds of potash.
   (*d*) Clover sod as a factor in determining the proportion of nitrogen to be supplied.
   (*e*) Best formula for a complete fertilizer for this particular crop, taking into account the potato plant, the previous crops and their fertilizer treatment in the system of crop rotation followed on the home farm, the present soil conditions, and the purpose of the crop.
   (*f*) Most liberal amount of fertilizer warranted for use in growing this particular crop, in view of the known condition of the land and the assimilative powers of the potato plant; and the saving in cost by home mixing of the supply to be used.

3. *Using the best seed.*—The related study here would include knowledge of:
   (*a*) Botanical characteristics of the potato plant; the difference between a seed and a tuber; and potato improvement by various methods and conditions of propagation, taking into account tendencies of the potato plant to "variation" and to "mixing in the hill."
   (*b*) Importance of planting "seed" selected in the field from the best-yielding hills, rather than seed selected from the bin merely by size of tubers.
   (*c*) Advantage of using potatoes for planting which have been properly stored, and the effects of freezing and sprouting in the cellar.
   (*d*) Conditions under which it may be desirable to sprout potatoes to be used for planting, in a warm, well-lighted room—the temperature, the time, and the care in handling required for such sprouting.
   (*e*) Size of piece and number of eyes to the piece, as important factors in starting the crop and in the quantity of its yield.

4. *Proper planting.*—The related study here would include knowledge of:—
   (*a*) Botanical and chemical characteristics of the potato plant, as to

its feeding habits, the growth of the tubers, and the effect on the tubers as food products of exposure to the sun during their growth.

(*b*) Distances between rows, and between seed pieces in the row.

(*c*) Depth of planting, in its relation to protection of the tubers from the sun, shielding the crop from possible rot-producing bacteria and spores, and subsequent cultivation, whether by the "level" or by the "hill" method.

(*d*) Best time for planting, whether for "early" or for "late" potatoes.

5. *Proper spraying.*—The related study here would include knowledge of:

(*a*) Botanical characteristics of the potato plant, particularly the relation of health and luxuriance of foliage to tuber production.

(*b*) Insect enemies of the potato plant, and their entomological characteristics, such as their methods of propagation and their feeding habits.

(*c*) Depredations of insects, and their possible relation to attacks upon the potato plant by plant diseases.

(*d*) Paris green: its chemical composition; its protective action against the insect enemies of the potato plant; dangers attendant upon its use; its possible combination with Bordeaux mixture; and the best formula, method of preparation, and periods for its application.

6. *Proper cultivation.*—The related study here would include knowledge of:

(*a*) Physical characteristics of the soil, particularly the capillary movement of water to the surface of the soil, and exhaustion of soil moisture by evaporation.

(*b*) Surface conditions most favorable for receiving rain water without washing, puddling, or subsequent baking.

(*c*) Value of a "soil mulch," and the most desirable method and frequency of cultivation for maintaining such a mulch.

(*d*) Comparative cost and advantages of "level" and "hill" cultivation, and reasons for the choice of the particular method to be followed in cultivating the present crop.

B. Insuring the cleanest crop by:

1. *Dipping the "seed" potatoes* in a formalin solution. The related study here would involve knowledge of:

(*a*) Plant parasites which produce "scabby" potatoes, and the biological conditions favorable and antagonistic to their growth.

(*b*) Formalin solution: its chemical constitution; its chemical action on these damaging potato parasites; and the proper formula and method for its use in protecting the potato crop.

2. *Substitution of chemical fertilizers* for barnyard manure. The related study here would involve knowledge of:
   (*a*) Dangers of infection from the use of barnyard manure.
   (*b*) Dangers of infection, if any, from the use of chemical fertilizers.

C. *Insuring the soundest crop by spraying* the potato plants with Bordeaux mixture. The related study here would involve knowledge of:
   (*a*) Bacterial and fungous diseases to which the potato plant is subject; evidences of their presence; and whether or not they are preventable.
   (*b*) Bordeaux mixture: its chemical composition; its protective action against potato-plant diseases; and the best formula, method of preparation, and periods of application for its use.

D. *Other minor projects* would include the most profitable means and methods of harvesting, storing, and marketing the crop. And other studies related to these projects would include knowledge of potato implements and machines and their use; the comparative advantages of field pit and cellar for storage; principles and means of ventilation, and the temperature at which potatoes should be kept; near and more distant markets, and comparative transportation cost; prices and the probable tendency of prices, in view of the press and government reports of the potato crop for the state, the country, and the world.

General observations on related study.—The study related to the work of carrying out this potato project embraces, therefore, important matter from several sciences, including botany, chemistry, physics, entomology, bacteriology, and plant pathology. For the calculations, mathematics would be necessary; for keeping the accounts, bookkeeping would be required; for correct correspondence, there should be training in business English; consideration of transportation, markets, and world-production would involve knowledge of commercial and agricultural geography.

The project method of instruction on the side of related study, thus, it will be evident, must insure that the boy, in carrying out his projects, shall pass through a thoroughgoing educational process.

Good citizenship.—It is proposed, furthermore, that the division of time, in carrying out the school and home farm co-operative method of training, shall be about as follows: for the execution of the projects, including work during vacations and other out-of-school hours, 50 per cent; and for the related study, 30 per cent. The remaining 20 per cent of the time of the boy is expected to be used for general culture and good citizenship instruction, wherein systematic courses may be

provided in such subjects as English, history, civics, current events, mathematics, and science.

AGRICULTURAL INSTRUCTOR AND HOME WORK SUPERVISION

In order to carry out the project method in agricultural part-time work, it has been shown that it is necessary to employ at least one instructor throughout the summer for supervision of the home-farm enterprises of the pupils. And it is evident that such an instructor must possess special qualifications for this work, in preparation, experience, and personality.

He should be a graduate of an agricultural college.—His preparation should include graduation from an agricultural college or its equivalent. He should be familiar with and keep in touch with the officers and the work of the agricultural college and experiment station of the state in which he serves and he should keep in touch with the experiment stations in other states where work is being done under conditions similar to those in his state.

He should be familiar with the work of the United States Department of Agriculture, so far as it is applicable to his state. He should be capable of keeping in touch with new literature in pamphlet, periodical, and book form, as it is issued, and to the extent that it may be applicable to his locality. He should be familiar with the work of organizations concerned with rural progress in his state, and capable of heartily co-operating with their officers.

His experience.—Preferably, such a person undertaking to prepare for agricultural teaching, in Massachusetts for example, should have been reared on a Massachusetts farm, or on a farm where the agricultural operations would yield experience of value for work in this state. He must be a master of farming as a handicraft and amply able to demonstrate the things which he undertakes to teach; and he should be familiar with, and be able to demonstrate the use of, the kinds of farm machinery which can be economically used on farms of his locality.

His personality.—Since he must teach, such an instructor or supervisor must be effective in discipline; that is to say, in the handling of boys. He must be prepared to meet people in his community pleasantly, and establish agreeable working relations with them. He must be prepared to maintain harmonious relations with his fellow-teachers,

and be amenable to the authority of the officers responsible for the school which he serves.

His school year should provide for service during the spring, summer, and fall months, giving him a vacation during the winter months; rather than for service during the fall, winter, and spring, with summer months for vacation purposes. Such a program would insure his services throughout the growing and harvesting seasons; and, by allowing him time for proper professional improvement through winter study at the state agricultural college, and through further observation and experience on intensive commercial plants, such as those devoted to poultry, certified milk, and greenhouse and hot-bed production of vegetables, cut flowers, and foliage plants, should make him permanently and increasingly useful.

His absence during winter months would not seriously disturb the curriculum of the school; on the contrary, it would make room for the teaching of related subjects, including manual-training projects related to the farm, by other members of the staff to the lower classes; it might also enable the higher classes to take winter short courses at the agricultural college, and thus make them acquainted with men engaged in research and experimental work.

The salary of such a supervisor is an important consideration. Experience seems to show that, in order to command the services of a man having the technical training, practical experience and personality called for in the above discussion of the necessary qualifications of a successful supervisor, salaries ranging from $1,200 upward must be paid. One such instructor in Massachusetts was started at $1,500 and will be advanced $100 a year to $2,000, if his work continues to give satisfaction.

The problem of necessary salaries is an economic one at bottom.—In order to attract to the work a supervisor of the type herein described, it will be necessary to make the compensation which he is to receive as good as, or better than, that which is offered to him in competing lines of work.

CONCLUSION

It is believed that home farm work, supervised by the school, where conditions are at all like those in Massachusetts, might well be substituted as far as possible for the present methods of much work, little work, or no work at all of a *productive and managerial* nature, now

found in connection with vocational agricultural school training; and that the project method of bringing agricultural science immediately to bear on actual farm practice, in going commercial agricultural enterprises conducted by the boys themselves, is a promising solution of our most pressing problem in this field of vocational training.

The Smith's Agricultural School at Northampton, Massachusetts, beginning with the school year 1908–9, has employed a man for the express purpose of assisting the boys throughout the summer in applying the teachings of the school in their home farm work. This method immediately appeals to the motor instincts and activities of boys of secondary school age. The success of boys in the corn-growing clubs in many states shows that boys instantly respond to help at home.

A school boy of sixteen at the recent Massachusetts Corn Show won the sweepstakes against all comers, including the sweepstakes winner of last year at the big New England Corn Show, for the best single ear of corn and also for the best collection of ten ears. He had been given seed by the former winner, and had been told and shown out of school hours what to do, and when and how to do it on his father's land. Most boys, like most men, learn best by being told and shown on the field of action.

This method offers the boy, all too eager to quit school for work on reaching his fourteenth birthday, a strong incentive to continue in school; because it bids fair to make him *an earner while still a learner.* Boys like to feel that as members of the family they are at last able to pay their own way.

In short, it is believed that the vocational education for farming outlined in the above discussion, and embodying the project and part-time work method, will justify itself from every reasonable point of view, and that the school, or system of schools which adopts it and works it out patiently and persistently will find that it possesses undeniable merit as a method of training not only for farming as a definite calling, but also for intelligent and vigorous participation in the community life of any commonwealth.

III. STATE-AIDED DEPARTMENTS OF AGRICULTURE IN PUBLIC HIGH SCHOOLS

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Eleven states have appropriated funds to encourage the teaching of agriculture in existing public high schools. Several other states have made provision for special agricultural schools or given money for conducting teachers' training courses in which agriculture is one of the subjects of instruction, but these are not considered in this paper.

Virginia was first of the eleven states to make a specific appropriation for the teaching of agriculture in public high schools. In 1908 the Virginia Assembly appropriated $20,000 to enable the State Board of Education to inaugurate courses in agriculture, home economics, and manual training in at least one public high school in each of the ten congressional districts of the state, and has since increased the appropriation to $65,000, including $25,000 to aid the schools in providing buildings and equipment, and $10,000 for extension work to be conducted by them. There is nothing in the legislation to indicate how much money each school shall receive, because the number of schools to be aided, and hence the amount available for each, is not stipulated, this whole matter being left to the discretion of the State Board of Education.

Virginia was followed in 1909 by Maine and Minnesota. At that time Maine gave funds for instruction in agriculture and other industrial subjects in incorporated academies, but two years later an act was passed extending such aid to free high schools—two-thirds of the total expenditure for instruction in agriculture, home economics, and mechanic arts, but not to exceed $500 a year to any one school.

Minnesota passed an act giving $2,500 to each of ten high, graded, or consolidated rural schools maintaining courses in agriculture, home economics, and manual training, and the work of these ten schools proved to be so popular that in 1911 the legislature extended state aid at the rate of $2,500 a year to twenty additional schools, and also passed another act giving $1,000 a year to each of fifty schools to aid in main-

taining courses in agriculture and either in home economics or manual training.

In 1910, Louisiana, Maryland, and New York passed somewhat similar laws, and in 1911, Kansas, Massachusetts, North Dakota, Texas, and Wisconsin were added to the list. That local school authorities are ready and willing to meet all reasonable requirements as to expenditures for equipping and maintaining departments of agriculture, home economics, and farm mechanics in order to secure state aid, is shown by the rapid growth in the number of such state-aided departments. In May, 1910, there were twenty-eight schools receiving state aid for agriculture, while in November, 1911, there were at least two hundred and fifty.

The character and amount of state aid and the requirements to be met in the different states are shown in the following brief statements.

Kansas

Law—Session Laws of 1911, chap. 24, sec. 2.

Number and kind of schools aided—Any high school maintaining a normal-training course under the provision of chap. 212 of the Session Laws of 1909. The State Board of Education has approved 98 schools for 1912.

Character and amount of aid—"The sum of $250 per annum," the total state appropriation for this purpose being $25,000 for 1912, and $25,000 for 1913.

For what purpose—The maintenance of "courses in the elements of agriculture and domestic science."

Requirements to be met—At least ten pupils must be "enrolled in such industrial courses each semester." The State Board of Education has agreed that teachers in either of these courses must have special training for their work and their qualifications must be approved by the State Superintendent of Public Instruction. A minimum of 1 year in agriculture and 1 year in domestic science, preferably in the second year, will be required. "Laboratory work shall require double periods."

Administered by—The State Board of Education.

Louisiana

Law—Acts of Louisiana, 1910, No. 80, making appropriations to defray the ordinary expenses of the government, etc.

Number and kind of schools aided—Not more than 20 high schools maintaining agricultural departments in the school years 1911 and 1912.

Character and amount of aid—A lump sum appropriation for the year ending June 30, 1911, $25,000, and for the year ending June 30, 1912, $25,000.

Since the State Board of Education has decided not to aid more than 20 schools in 1911 and 1912, the appropriation to each school will be from $1,200 to $1,500. Nine schools maintained departments of agriculture in 1909–10 without state aid.

For what purpose—The maintenance of agricultural departments in connection with public high schools.

Requirements to be met—The State Board of Education has adopted regulations making the following requirements: Each school must have a demonstration farm of at least 5 acres, fenced against rabbits, chickens, and stock, and an option on 5 acres more if needed; there must be a barn with at least 5 stalls for horses and cattle, a weevil-proof grain bin, fertilizer and tool rooms, and a hayloft; the agricultural departments of approved high schools shall have at least $100 worth of apparatus for teaching agriculture in addition to the regular apparatus for such schools, and those not on the approved list must have $100 worth of apparatus for agriculture and from $75 to $150 worth of other apparatus; the school must also have at least $40 worth of tools and $140 worth of farm implements; an appropriation of at least $250 for maintenance annually; and must own a horse or mule. The teacher of agriculture must be a graduate of an agricultural college with some practical experience in farming, and must be satisfactory to the department of education; he cannot be principal of the school and must not be required to teach any class in the school outside the department of agriculture except in botany and zoölogy, if these subjects are given an agricultural trend; he must be employed for twelve months in the year.

Administered by—The State Board of Education through the Supervisor of Agricultural High Schools.

Maine

Law—Act of 1909 providing state aid for instruction in agriculture and other industrial subjects in incorporated academies, superseded by "An Act for the Encouragement of Industrial Education," Public Laws of 1911, chap. 188.

Number and kind of schools aided—Any free high school or incorporated academy.

Character and amount of aid—"A sum equal to two-thirds the total expenditure for instruction in each of said courses, provided, however, that no school shall receive a total in excess of $500 in any one year for the support of said courses."

For what purpose—Instruction in the "principles of agriculture and the domestic and mechanic arts."

Requirements to be met—An average attendance of not less than 12 students in any course for which state aid is claimed. The course of study, equipment,

and qualifications of instructors to be prescribed by the State Superintendent of Public Instruction.

Administered by—The State Superintendent of Public Instruction, except that the funds are paid out upon order of the Governor and Council.

Maryland

Law—Acts of 1910, chap. 386.

Number and kind of schools aided—Any high school of the first or second group. High schools of the first group must have not less than 80 pupils, 4 teachers of high-school subjects, exclusive of teachers of special subjects, a course of four years of 36 weeks each, and provision for manual-training and domestic-science courses and also for a commercial or an agricultural course. High schools of the second group must have at least 35 pupils, 2 teachers of regular subjects, a three-year course, and a manual-training (construed to include domestic science), or an agricultural, or a commercial course.

Character and amount of aid—In addition to state aid for the salaries of the principal and regular teachers, schools of the first group receive from the state "$400 on account of each of 2 special teachers, who shall spend at least two-fifths of their time in the school receiving said amounts, and schools of the second group $400 on account of 1 teacher of special subjects, provided that if an instructor in manual training or agricultural work be required to divide his or her time among not more than four schools of this group, $150 shall be allowed on account of each of such schools."

For what purpose—Instruction in manual training and domestic science and commercial or agricultural subjects.

Requirements to be met—So far as agriculture is concerned high schools of the first group must conform to a four-year course of study prescribed by the State Board of Education, requiring a minimum of two recitations of 40 minutes each and one practicum of 80 minutes each week.

Administered by—The State Board of Education.

Massachusetts

Law—"An Act to Codify and Amend the Laws Relating to State-aided Vocational Education," approved May 26, 1911.

Number and kind of schools aided—Public high schools.

Character and amount of aid—Two-thirds of the salary paid to instructors in agriculture, provided that the total state expenditure for this purpose shall not exceed $10,000 in any one year.

For what purpose—The maintenance by cities and towns of "local or district independent agricultural schools consisting only of agricultural departments in high schools."

Requirements to be met—Approval by the State Board of Education "as to organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission, employment of pupils, and expenditures of money."

Administered by—The State Board of Education.

MINNESOTA

Putnam Act

Law—"An Act to Amend Chapter 247, General Laws 1909, Entitled, 'An Act to Provide for the Establishment and Maintenance of Departments of Agriculture, Manual Training, and Domestic Economy in State High, Graded, and Consolidated Schools, and to Authorize Rural Schools to Become Associated with Such State, Grade, or High Schools, and Making Appropriation Therefor,' and to Provide for Levying of Taxes to Carry Its Provisions Into Effect," approved April 5, 1911.

Number and kind of schools aided—Any high school, graded school, or consolidated rural school having satisfactory rooms, equipment, and location, limited, however, by a state appropriation for 30 such schools for the years ending June 30, 1912, and June 30, 1913.

Character and amount of aid—Not exceeding $2,500 a year on account of the maintenance of an agricultural and industrial department, and $150 a year for each rural school associating itself with a Putnam school.

For what purpose—The maintenance of an agricultural and industrial department to consist of courses in agriculture, manual training, and home economics.

Requirements to be met—The employment of trained instructors whose qualifications are approved by the State High-School Board, and provision for a tract of land suitable for school garden and purposes of experiment and demonstration containing not less than 5 acres. "The instruction in such agricultural and industrial department shall be of a practical character, dealing with soils, crops, fertilizers, drainage, farm machinery, farm buildings, breeds of live stock, live-stock judging, animal diseases and remedies, production of milk and cream, testing of same, manufacture of butter and cheese, horticulture, gardening, plants, and such other questions as have a direct relation to the business of farming, including bookkeeping and farm accounts. It shall also include systematic courses in manual training, and in home economics, as these are usually taught in public schools."

Administered by—The State Department of Public Instruction through the State High-School Board.

Benson-Lee Act

Law—"An Act to Provide for the Teaching of Certain Industrial Subjects in High and Graded Schools, and Fixing the Amount of State Aid for Such Instruction, and the Manner of Its Payment," approved April 7, 1911.

Number and kind of schools aided—Any high school or graded school, the number being limited by a state appropriation for 50 such schools in 1912 and 1913.

Character and amount of aid—One thousand dollars annually.

For what purpose—The maintenance of a course in agriculture and either in home economics or in manual training.

Requirements to be met—The State High-School Board has prescribed rules requiring that the courses authorized by this law shall be maintained throughout the school year, and that in addition to the longer course each school shall offer a free winter short course of not less than 3 months. The instructors shall have had training in their respective lines in technical schools, those in agriculture being graduates of an agricultural college or having an equivalent technical training. Suitable rooms and equipment shall be provided, and the instructor in agriculture shall have a room exclusively for his work, shall be provided with laboratory facilities, and shall have not less than a continuous half-day for agricultural work. He shall make a close study of local conditions, and attend markets, horticultural meetings, meetings of creamery and stock-breeding and other associations, and such other gatherings as afford opportunity to make the acquaintance of farmers. The work in agriculture is to include textbook work, laboratory courses, special work along some line of local interest, such as dairying, corn breeding, poultry, etc., institute work in co-operation with the extension division of the State College of Agriculture, and a winter short course. Two satisfactory daily periods in an industrial subject or subjects are held to count as a credit.

Administered by—The State Department of Public Instruction through the State High-School Board.

NEW YORK

Law—Education Law 1910, art. 22.

Number and kind of schools aided—Any city school or union free school.

Character and amount of aid—The sum of $500 to each city and union free school for each independently organized school (here meaning nearly the same as "department" or "course" in other states) "of agriculture, mechanic arts, and home-making, maintained therein for 38 weeks during the school year and employing one teacher whose work is devoted exclusively to such school, and having an enrolment of at least 25 pupils and maintaining a course of study approved by him," and the further sum of $200 for each additional

teacher thus employed. "The Commissioner of Education may in his discretion apportion to a district or city maintaining such schools or employing such teachers for a shorter time than 38 weeks, an amount pro rata to the time such schools are maintained or such teachers are employed."

For what purpose—To be used exclusively for the support and maintenance of schools of agriculture, mechanic arts, and home-making, independently organized but forming a part of the public-school system.

Requirements to be met—The school or course in agriculture, mechanic arts, and home-making must be maintained 38 weeks to secure in full the benefits of this act, must have an enrolment of at least 25 pupils, employ a teacher or teachers "holding a special agricultural-school certificate and devoting their entire time to the teaching of agriculture, mechanic arts, cooking, sewing, bookwork relating to agriculture, etc.," and must conduct a course of study approved by the State Department of Education. The State Department announces that "classes of book study only in agriculture and home-making are not entitled to the benefits of the law establishing these courses," and recommends that the "practical phases of work in these courses should extend through at least one-third of the weekly program, and more if school conditions permit."

Administered by—The New York State Education Department through its division of trade schools.

North Dakota

Law—Laws of 1911, chap. 40, approved March 18, 1911.

Number and kind of schools aided—Any state high school, graded, or consolidated rural school having facilities to do agricultural work, the number being limited to 5 the first year, and an additional number of not more than 5 every two years thereafter. Owing to a veto by the Governor of the appropriation to carry out the provisions of this act for 1912, there will be no funds for these schools until 1913.

Character and amount of aid—Each school will be entitled to $2,500 a year of state aid but will not participate in the state aid now being given to the state high schools—$600 to $800 a year.

For what purpose—The maintenance of an agricultural department.

Requirements to be met—The employment of trained instructors in agriculture, manual training, and domestic science, provision for a tract of land suitable for a school garden and purposes of demonstration containing not less than 10 acres, and located within one mile of the school building, the maintenance of special winter courses when necessary to accommodate a reasonable number of boys and girls, and the giving of instruction in soils, crops, fertilizers, drainage, farm machinery, farm buildings, breeds of live stock, stock judging,

animal diseases and remedies, production, testing and hauling of milk and cream, the manufacture of butter and cheese, the growth of fruit and berries, management of orchards, market garden and vegetable crops, cereal grains, fine seeds, bookkeeping and farm accounts, and all other matters pertaining to general practice.

Administered by—The State High-School Board.

TEXAS

Law—Acts of Thirty-second Legislature, chap. 26, sec. 3, approved March 6, 1911, became a law June 11, 1911.

Number and kind of schools aided—Any high school of the first, second, or third class. A high school of the first class is one which maintains at least four years of work above the sixth grade and employs at least two teachers of high-school subjects; a high school of the second class, three years and two teachers; and a high school of the third class, two years and one teacher.

Character and amount of aid—In high schools of the first and second class the state will duplicate local appropriations within the following limits: agriculture, $500 to $1,500; domestic economy, $500 to $1,000; and manual training, $500 to $1,000. In high schools of the third class state aid is confined to courses in agriculture, $500 to $1,000. No school may receive in one year more than $2,000 from the state, and "such appropriation shall not be made more than twice to the same school." Fifty thousand dollars a year has been appropriated to meet the requirements of this law in 1912 and 1913.

For what purpose—Establishing, equipping, and maintaining courses in agriculture, domestic economy, and manual training.

Requirements to be met—The local board shall provide ample room and laboratories for teaching each subject and, in connection with the department of agriculture, shall provide a tract of land suitable to the production of farm and garden plants, and shall employ a teacher who has received special training for giving efficient instruction in agriculture. The State Superintendent of Public Instruction has decided upon a minimum of 3 acres of land suitable for agricultural purposes to be owned by each school applying for state aid for agriculture.

Administered by—The State Board of Education.

Grants of aid are made, upon recommendation of the State Superintendent of Public Instruction, only to those schools which give evidence that after state aid is withdrawn they will continue to maintain the special departments.

VIRGINIA

Law—Item in appropriation bill of 1908–9 and acts of 1910, p. 362.

Number and kind of schools aided—At least one public high school in each

congressional district (10 in number) in the state. There are 10 of these schools now in operation.

Character and amount of aid—In the appropriation bill $20,000 a year was given for apportionment among these schools. By the act of 1910 the amount was increased to $30,000 annually, and for the year ending February 28, 1912, the further sums of $25,000 for the purpose of providing buildings and equipment for these schools, and $10,000 for "traveling, demonstration, and extension work to be connected" with them.

For what purpose—Maintaining "a thorough course in agriculture, the domestic arts and sciences, and manual training, ... and at least one-fourth of the school time shall be devoted to these subjects." All female students attending these schools shall be instructed in domestic sciences and arts as required subjects and may also elect agriculture. These schools may also be used as centers for directing farm demonstration work and other extension work throughout the several congressional districts, under regulations prescribed by the State Board of Education and the State College of Agriculture.

Requirements to be met—Not less than 5 acres of land convenient to the school to be cultivated by the students, as far as practicable, for demonstration purposes. Suitable buildings and equipment, including shops for elementary manual training, benchwork, and other forms of shopwork applicable to rural life. The district boards shall provide suitable equipment for domestic-science instruction.

Administered by—The State Board of Education.

By the acts of 1910 the boards of supervisors in the several counties of the state are authorized to appropriate such sums of money as to them may seem proper for the establishment, equipment, or maintenance of the schools referred to above.

Wisconsin

Law—Laws of 1911, chaps. 544, 545.

Number and kind of schools aided—Any "free high school or a high school having a course of study equivalent" thereto.

Character and amount of aid—State aid amounting to $250 for each special department maintained only in the high-school years and $350 for each such department maintained in the high school and "the three upper grades next below the high school." The maximum that any school can receive is $1,050 a year.

For what purpose—To establish and maintain departments of manual training, domestic economy, and agriculture.

Requirements to be met—The carrying out of a course of study or outline of work in manual training, domestic economy, or agriculture, approved by the State Superintendent of Public Instruction, and the employment of qualified

teachers, whose salaries "shall be at least at the rate of $60 per month." A course of study involving 4 units in agriculture and agricultural chemistry has been outlined, together with suggestions concerning apparatus, equipment, and supplies, which outline has been approved by the State Superintendent of Public Instruction and published as a bulletin of the University of Wisconsin.

Administered by—The State Superintendent of Public Instruction.

From these statements it will be seen that state aid varies in the different states from $250 to $3,000 to each school, that the number of schools receiving state aid is usually limited by the size of a lump sum appropriation, and this appropriation varies from $10,000 in Massachusetts to $125,000 in Minnesota.

Louisiana and Massachusetts give state aid for agriculture alone, Kansas for agriculture and home economics, while the other eight states include agriculture, home economics, and manual training or farm mechanics. The requirements to be met as to equipment and local expenditures are in the case of eight of the states partially included in the legislative enactments but in Louisiana, Maryland, and Massachusetts practically all requirements are prescribed by the state authorities designated to administer the laws. These state authorities are in every case members of the state board of education, or, as in Louisiana, Massachusetts, and New York, special officers appointed by the state board of education. In Louisiana the special officer in charge of agricultural courses in high schools is also an officer of the state agricultural college. In New York this officer is a member of the staff of the state department of education and he has charge of the corps of district supervisors of elementary schools who are appointed as the result of civil-service examinations and are required to give special attention to nature-study and elementary agriculture in the schools under their supervision.

The requirements to be met by the schools receiving state aid vary greatly in the different states, but in the main they include the employment of teachers having special training for their work, provision for suitable laboratories and laboratory equipment, land for educational work in agriculture, and the [illegible] of courses of study approved by the state authorities in charge.

ADVANTAGES OF A SYSTEM OF STATE AID FOR AGRICULTURAL AND INDUSTRIAL SUBJECTS

As a system for the development of agricultural and industrial education, state aid possesses many advantages over any system depending solely upon local initiative. In the first place it usually insures better

equipment. These are primarily laboratory rather than textbook subjects, and adequate equipment is essential to success in teaching them. Laboratories, special apparatus, and land are needed, and these are much more likely to be provided if state aid depends upon them than under a system depending entirely upon local initiative for development.

Secondly, state aid carries with it a certain amount of state supervision, and this can more easily be made expert supervision than where everything concerning courses of study and methods of teaching are left to town or county superintendents. Three of the states have already employed experts to supervise the work in agriculture in state-aided schools, and at least one other state would employ a supervisor at once if the right man could be found. The lack of expert supervision is quite generally recognized as one of the greatest weaknesses of our public-school systems, and anything that will help to overcome this weakness should be actively promoted.

And finally, state aid will greatly stimulate the introduction of agriculture, home economics, and farm mechanics into our public high schools, and contribute materially to the success and permanence of this work. This will be accomplished because higher salaries will be paid and better teachers will be secured and retained. With the present demand for teachers of agriculture it is almost impossible for an unaided high school to secure an agricultural-college graduate and keep him for more than one year. Competent teachers of agriculture command higher salaries than those in any other high-school subject. One of the state-aided schools last year paid its teacher of agriculture $1,400 and its principal $950. It is not uncommon for agricultural-college graduates to get $1,200 to $1,500 the first year out of college, and in fact the average salary of 95 such graduates in 1910 who accepted positions as teachers or investigators was $1,017. Very few unaided high schools would feel able to employ special teachers at such salaries.

But if agriculture is to be taught in public high schools, it is highly important that good teachers, well trained technically, be employed and retained year after year. There are numerous examples of high schools that have developed excellent work in agriculture, helpful alike to the pupils and to the farmers of the community, only to have it deteriorate greatly or lapse entirely with the loss of the teacher responsible for developing it. State aid would tend, and is now tending, to overcome this difficulty by making higher salaries available and by creating a

permanent general policy with reference to the development of high-school instruction in agriculture. Agricultural-college graduates are more willing to accept high-school positions in states committed to such a policy. The building up of a well-paid and stable teaching profession is a matter of the utmost importance in this country, and if the appropriation of a few thousand dollars a year by state legislatures will contribute to this end and at the same time help to prepare young men and young women for better service on the farm, in the shop, and in the home, it is well worth trying.

IV. HIGH-SCHOOL AGRICULTURE WITHOUT STATE SUBSIDY

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The public schools of America were created as institutions through which the state could protect itself, and insure its perpetuity by affording means for training the child-mind and thus making each individual more and more intelligent and more and more capable of self-government. In the earlier stages of our history any training beyond the rudiments was not possible in public institutions. Practically all advanced training was secured through the private school, academy, seminary, or college.

As time passed by, these private institutions either passed away because of lack of support or were transformed into preparatory institutions for still more advanced training to be received in a university. When this condition became apparent, the people, realizing the need of opportunities for broader training than the common schools of that time afforded, created the "union" school, which later became the modern high school. The high school was authorized by law, and its support made obligatory upon the people in the interests of broader education.

The term "broader education" in this instance meant instruction in the classics, languages, literature, mathematics, and science, and these subjects constitute the traditional course of study, the pursuance of which is supposed to result in education. Various definitions of *education* have been given in the past, and probably no single school has ever measured up to any one definition. If education is to "fit for complete living," or if it is to give one power, we must admit in the first instance that the high-school graduate is not fitted for life, and in the second instance if he has power it is only in the "potential" form.

In order to give the product of the public school real power, or active power, the work of the schoolroom must be attached to the activities of human life through the introduction of such courses as will enable the student, in the process of his training, to apply principles to the actual solution of some of life's problems. In other words, vocational courses will afford an opportunity for such application, and at the same time

enable the student to discover his own aptitudes and develop a real purpose in life before he leaves the public school.

The traditional course of study, as noted above, need not be discarded; in fact, it must not be discarded, but it may be modified. Without any doubt we are spending altogether too much time upon some subjects and in so doing we have excluded others which might become even more valuable than the usual subjects.

During the past fifty years we have been experiencing a period of educational development through successive transitions from one theory of education to another, and in this period of development in educational needs the world of commerce and industry has moved forward by rapid strides. For many years the great struggle in the business world has concerned itself with securing the largest possible utilization of natural resources, and at the same time the highest degree of efficiency. In order to assist in this movement the business world has called upon the educational institutions for extensive researches into the mysteries of natural forces. Scientific schools and universities have been taxed to their limits to meet this demand.

The establishment of colleges of agriculture and mechanic arts grew out of a realizing sense on the part of a few far-sighted business men that the forces of Nature were not being utilized to their limit, and also that we were in great danger of severe losses because the unwise use of these forces was producing deterioration in them. Soil which had once produced profusely was found to be practically worthless. The mineral resources of mother Nature were being exhausted and some means must be provided by which these losses could be made good. It is the special province, then, of our technical institutions to give such training to the human mind as will enable it to utilize wisely natural forces and prevent waste.

It is not the province of this paper to discuss the work of higher institutions of learning, and we therefore proceed to discuss the relation of the high school, this modern institution the doors of which are open to all classes of people, to the great problem of the use and conservation of natural resources.

The high school has been called the "people's college," which statement contains more or less of truth. The work done in this school includes what we call in this country "secondary education." The course of study covers a period of four years which is based upon the completion of the so-called "elementary branches."

The children enter the high school on the average at fourteen years of age, in the midst of the adolescent period. The process of man-making is going on, and for this reason the high-school period has been called the "formative period." The child enters the school generally with no fixed ideas of his future, and with little knowledge of his own personal aptitudes, largely because of the character of his previous training, or lack of training. If it is true that the period from fourteen to eighteen years is the formative period, then it would seem perfectly logical that during such time he should be introduced to the activities of human life; and his true development would consist in relating his knowledge of literature, mathematics, science, and art to the activities in which men and women engage. Probably the greatest function of the high school is to open the door of opportunity before boys and girls and give them somewhat of a vision of their own possibilities.

We have passed the point in educational history when it is particularly necessary to present arguments and reasons why agriculture and other vocational subjects should be taught. It has become perfectly clear that if there is good ground why agriculture should be taught in a collegiate institution there are equally good grounds for its being taught in a secondary institution.

The purpose of this paper is largely to describe what has already been done in agricultural education in those states which do not grant a special subsidy to individual schools for the introduction of such courses. There are various plans of operation, and we must remember that we are at the very beginning of agricultural education so far as it relates to secondary schools. Courses of study have not been thoroughly organized and we have not had time to judge of actual results. We have simply gone far enough to demonstrate the feasibility and the advisability of introducing a course of some kind in agriculture. We shall deal largely with conditions as they exist at the present time in the states of Illinois, Indiana, Michigan, Nebraska, and Ohio, these states not having as yet authorized state subsidy for any special courses in the public schools.

ILLINOIS

In answer to certain inquiries, State Superintendent Blair gives the following information:

"We have no laws requiring the teaching of agriculture in public schools. Something in the way of nature-study and the elements of agriculture has been

attempted in probably 2,000 out of the 11,000 rural schools. We have in this state several kinds of public high schools known as the 'village high school,' the 'city high school,' and the 'township high school,' and we have several hundred such schools. Out of this number probably 25 are presenting some work in agriculture.

"Thus far the teaching of agriculture has been a growing sentiment rather than an accomplished fact. Some county superintendents and able country teachers are making strong efforts to give the children of the country the benefit of such instruction. A few of the schools have seriously taken hold of the matter, and offer as good a course in this subject as in any other of the high-school subjects. We have no special secondary schools of agriculture in this state."

INDIANA

State Superintendent Greathouse writes:

"The teaching of agriculture in the public schools in this state is not required by law. It is encouraged and is taught in probably 2,500 elementary schools and 200 high schools. Teachers are not required to pass an examination in this subject, and in many places the work is not well done. There are no special schools of agriculture of secondary grade in this state."

NEBRASKA

State Superintendent Bishop, writes:

"Some instruction in agriculture is probably given in one-eighth of the rural schools, and in 108 public high schools. The subject of agriculture is presented in the ninth or tenth grades, and consists of a one-year course similar to a course in botany or any other subject which continues through one year, and is presented by means of a textbook. Nebraska has two special schools of agriculture of secondary grade, one recently established."

OHIO

State Superintendent Miller writes:

"Agriculture is taught in all township and village districts. The Board of Education determines in what year or years the course shall be given. At the present time in nearly all of the schools the instruction consists of a one-year course in the ninth or tenth grade, based upon a textbook."

MICHIGAN

In Michigan there is no law requiring the teaching of agriculture in any public school. Some definite instruction is being given in about 800 of the 6,500 rural schools, and regular courses in agriculture have been introduced in 15 high schools. These courses consist of one unit in each of the four high-

school grades, and the work is planned so as to develop a department of agriculture along the same lines that we develop departmental work in other subjects. In addition to these schools there are about 20 others which are giving some instruction in agriculture at some time during the high-school course, mainly by the use of an elementary textbook. In addition to these we have two special county schools of agriculture. These schools are in part supported by the state and are not germane to this discussion.

The subject of agriculture in the 15 high schools is taught in each case by a graduate of an agricultural college; and in several of the other schools where supplemental courses are given the instructors have had some special training in the subject of agriculture. The course of study covers the following subjects: Agricultural botany, horticulture and entomology, farm crops, the types of live stock, breeding and feeding live stock, dairying, soils, and farm management.

It will be seen from the foregoing statements that so far as secondary agriculture in public schools is concerned, we have hardly gone far enough to draw any definite conclusions. Enough has been done, however, to demonstrate certain things. Among these it has been clearly shown in each state that there is an interest on the part of the people in agriculture as a subject of study; second, that agriculture correlates nicely with other science subjects; third, that we can develop intellectual power through it; fourth, that the lives of many young men are redirected and turned toward agriculture; fifth, that practical results in farming processes in the community are secured.

It is true that for years the farmers have berated the agricultural colleges, and have ridiculed the idea of learning practical agriculture in a school. But the quiet and effective work of the agricultural colleges and high schools has demonstrated beyond question the possibility of developing a farmer of expert type through the process of school education, and public sentiment is now rapidly swinging around in favor of collegiate agricultural instruction, and the same sentiment is being rapidly converged toward the public school. In many communities we find an insistent demand on the part of the farmers that agriculture shall be taught in public schools. Thus far, as Superintendent Blair indicates, the introduction of agriculture into the public school has been accomplished through the state department of education, the county superintendent of schools, and special men representing agricultural colleges. These men have presented the matter to local superintendents and boards of education by showing the opportunities for practical work,

and the necessity of vocational instruction. Through these agencies the public interest has been aroused. In this connection we should mention, also, the assistance which has been rendered in many cases by progressive farmers who were members of the Grange or farmers' club, or some other farmers' organization.

The people are manifesting an intense interest, and yet they are not demanding, in the foregoing states at least, that this new feature of educational work shall be rushed into the public schools without due consideration, or without the best possible previous organization and classification.

In all of these states, boards of education have authority to introduce any subject into the course of study which, in their judgment, is deemed of educational value. There is no need, therefore, for any permissive legislation; and the introduction of the work depends entirely upon the active interest of the school authorities.

It is a matter of common knowledge that if the state or the nation offers any special financial inducement to perform any public improvement, the people respond quickly because of the natural desire to get their hands into the public treasury. Proof of this is shown wherever state aid is offered for the building of good roads, canals, drainage, or any other improvement. It necessarily follows that if the state should offer a certain sum of money to be given to any school district which would introduce a course of agriculture, that such district would make strenuous effort to comply with such a law in order to secure the money. The effect, therefore, of state subsidy will be to stimulate the introduction of agricultural courses.

At the present time all vocational courses are new, and thus far lack development, coherence, and organization; and state educational institutions have given no particular attention to the training of teachers for this particular phase of work. Agricultural colleges have confined their efforts to instruction in purely technical lines, and have not given the instruction from the standpoint of teaching, or with even a "pedagogical squint." For this reason there are very few persons who are really fitted to undertake instruction in secondary agriculture. As has been stated before, the student is in the formative period, and an error of judgment on the part of the teacher, or an error in the presentation or organization of the work, may bring disastrous results to the individual student in the end.

In spite of all these facts, however, if the state offers the subsidy, the school district, the teacher, and all other interested parties are at once combined to introduce the course. With few exceptions the instruction in the one-year courses of agriculture is given by a teacher who has had no special preparation for the work, and thus has no power to enlarge upon the elementary text which the student uses. In Michigan, in all of the high schools where regular courses are presented instructors have been secured who are graduates of an agricultural college, and in addition have had special courses in general pedagogy and agricultural pedagogy.

It would seem, therefore, a wiser policy to introduce agricultural courses slowly and with trained teachers in charge, having back of the work a public sentiment which is being properly organized, and which will become permanent, rather than to rush into the work at the speed which would, without any doubt, follow the offering of state subsidy. It is difficult for any movement to travel very far in advance of supporting public sentiment. It seems to us that public sentiment, where state aid is offered, would be more largely based upon the desire to secure such funds, than upon a real interest and desire for the development of agricultural instruction. Up to the present time my observation leads me to the conclusion that while state aid would, without any doubt, stimulate the introduction of these courses, there is great danger of overstimulation, with a corresponding danger of poor results.

At this stage in the progress of industrial education it seems that it would be wise public policy for the several state institutions to give special attention to the preparation of vocational teachers. The agricultural college will thus find a new field of work, and a field through which it can ultimately reach all sections of the state and influence them effectively and at the same time conservatively. In my opinion a one-year course in any vocational subject is not sufficient; and further, it is my opinion that every vocational subject should be taught by a specially trained teacher. I do not believe it wise public policy to introduce such courses and then leave the instruction to one who has merely received training in the traditional subjects.

Further, if agriculture is to be successfully presented, sufficient time must be given to each of the great fields, or subjects, to develop some definite results in the student. We are giving three years to mathematics, four years to science, and at least an equal amount of time must be given to the subject of agriculture in order to give it a proper standing

in the regular curriculum. This fact alone will impress the student with the importance of the subject.

The intellectual element has always been dominant in education; and while we may give physical, moral, intellectual, and industrial instruction—and in my judgment all these courses should be given—still, in the work of public education the intellectual element must continually be dominant. We are not introducing courses in agriculture merely in order to turn out trained farmers, but we are introducing these courses in order that the student may relate general science to agricultural science, and leave the school with an intelligent knowledge of the application of the scientific principles, and with a vision of what he can do in the application of those principles in actual farm activities. In other words, we seek to dignify the subject of agriculture by making it a subject of study, and to impress upon the student the fact that while much has been said about the dignity of labor, there is absolutely no dignity connected with any labor which does not evolve a finished product. That is to say, the farmer who can produce perfect corn, or perfect sheep, or perfect clover is no longer a mere farmer; he is now a professional man because of the perfection of his product, and there attaches real dignity to the process of evolution. What the country needs is intelligent farmers, professional farmers, or men who are artists in their line.

If we are to secure these results we must take time to develop a course of study which shall be logical in its arrangement, contain proper subject-matter, and be presented to the student by an intelligently trained teacher.

It is not the purpose of this paper to discuss the merits of courses now being presented. As a matter of fact, there are about two hundred schools in the state of Ohio in which a course in agriculture is presented in one year of the high school, usually the tenth grade; and as stated above, there are something over one hundred high schools in the state of Nebraska presenting a similar course, and about two hundred in the state of Indiana. For the most part these courses are presented by teachers who have not received special training; yet the fact that the student actually does study agriculture, actually reads the bulletins and pamphlets from his state college of agriculture, as well as from the national department of agriculture, must prove of immense benefit to him. The value of these courses we cannot determine. We are satis-

fied that they do contain valuable educational elements; that they result in a higher degree of intellectual training, and afford opportunity for the application of the general principles of science which the student receives through his courses in botany, physics, and chemistry.

In Michigan we are attempting to develop a course in agriculture which shall constitute four units. The average high school presents fifteen- or sixteen-unit courses, and a fair balancing of the courses, in our judgment, would require four units of cultural work, eight units of disciplinary work, and three or four units of vocational work. The vocational instruction may include courses in agriculture, home economics, art, and trade courses, each elective. This plan is being pursued in two of the city schools in Michigan, and thus far is producing excellent results. In this way we develop industrial departments in the high school and attach the school to some of the chief activities of common life, and in the process of instruction during the four years of the high school, as the student comes in contact with ordinary scholastic material and with manual operations which require intelligence, we give time for the development of aptitude, knowledge, and skill.

The introduction of industrial departments in the high school will place such instruction before practically all of the young people of any county or community, and also reach the people of an entire state. At the same time we make use of educational facilities already organized, and thus render unnecessary the creation of new or special departments for agricultural or industrial instruction.

These seem to be the facts and conditions as they exist at the present time. After public sentiment has once been aroused, and the school authorities have developed a reasonable and workable course of study, it would seem then perfectly proper for the state to offer its aid in the support of vocational courses.

V*A*. SHORT COURSES AND EXTENSION WORK FOR AGRICULTURAL HIGH SCHOOLS—IN THE SOUTH

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The purpose of the agricultural high school is to improve rural life. To accomplish this it must put itself in contact with the people who live on the farms. To reach these people it must make use of every device of demonstration and extension methods. I began my work as an agricultural high-school teacher with the usual assumption that if the younger generation can be educated in the best teachings of agricultural science and practice, it will quietly work a great revolution in the agricultural methods and life of the community.

I have not found the problem so simple. In the first place, country boys do not usually go to high school at all. The instruction in the rural schools is so bad and the terms are so short (5 to 6 months) that a boy of only average ability to learn is not ready for the high school until he is so old that the desire to learn is overcome by the need to earn. Only those boys try to finish the high school whose tastes and ambitions lead them toward the professions. In theory the agricultural courses should attract country boys to the high school; in fact, it is doing so at a rapidly increasing rate; but I have, like others, found myself face to face with the fact that only a distressingly small proportion of the boys do attend high school and that those boys are not as a rule farmers' sons and prospective farmers. This being the case, how can the school fulfil its mission?

My first thought was to do as the agricultural colleges did under similar circumstances, i.e., establish short winter courses for the sons of farmers. Notwithstanding my lack of room and equipment, I tried the plan and found it successful. There are within the reach of any agricultural high school a hundred young men who can and should take advantage of such a course lasting six to eight weeks and devoted to the subjects of greatest local interest. There are, however, in the smaller schools, such obstacles in lack of room, lack of equipment, and lack of

teaching-force as to make a full realization of the plan impracticable. Such a course would require the time of one person the greater part of the school year to interview the students and arrange lectures and laboratory sections. Accordingly as the work of teaching agriculture to the regular high-school classes has increased by the growth of the school and the increasing popularity of the subject, I have been, for the time, forced to give up this interesting and valuable part of the school's work. When, by federal aid or more liberal state appropriations I can have the necessary teaching-force and laboratory room to carry on short courses, I expect to take up the work again, and by a personal canvass of the surrounding territory offer a short course which is equal, so far as it goes, to that of an agricultural college. I have given such a course for two years and know of its possibilities from experience.

Farmers' institutes have been my most successful line of extension work. When I came to Manassas in 1908 I found no live organization of farmers with whom I could co-operate. I called a meeting of the farmers and after a pleasant session at which they were addressed by the late Dr. Seaman A. Knapp, I proposed that we form a permanent organization. The idea was adopted and a most successful series of meetings resulted. During the three years since the organization of the farmers' institutes of northern Virginia we have held twenty-two meetings, including a four-day traveling school of agriculture under the direction of the Virginia Agricultural College, a field demonstration in spraying, and three corn shows. These meetings are held in the courthouse on the third Friday of each month from November to April, inclusive. The average attendance for all meetings has been about seventy-five farmers, besides townspeople and school children.

Recognizing that unless the farmers are behind a school of agriculture it cannot be successful, I have endeavored to make this association the connecting link between the school and community. I believe that to these institutes more than to any other one factor I owe the success which I have had in making the agricultural school an integral part of the rural life of the district.

The success of the institutes has been due in most part to the high class of speakers which I have been able to secure from the U.S. Department of Agriculture and to the assistance and advice so freely given by Mr. D. J. Crosby, expert in agricultural education, of the Office of Experiment Stations.

As the winter days were cold and the roads long and muddy it occurred to me to utilize the class in domestic science by letting them serve a lunch to the farmers and their wives. This was done with the greatest success. The girls enjoy cooking and serving the meal and the visitors enjoy the hot, tasty, nutritious food which is served to them at the actual cost of the materials. The lunch has become a regular feature of the institutes and has, in no small degree, contributed to their success. At first these lunches were served at tables, but with the increasing numbers, the plan of a buffet lunch was tried with great success. The farmers get their well-filled plates and stand or sit in small groups eating and visiting in the most informal manner.

Valuable as the information given by the speakers has been, the social intercourse is even more valuable. This is a country of big farms and bad roads, resulting in more than the usual degree of rural isolation. This isolation has been intensified by the frequent changes in the ownership of farms since 1870, until, as a natural result there is but little of the community spirit. I can say without boasting that the school has done more to break up this isolation and develop a community feeling in three years than all other forces had done in a decade.

This year I am attempting to break down still further the barriers which distance and bad roads have imposed between the farmers by a series of meetings for farmers' wives. At these meetings they can become acquainted with each other, discuss problems of mutual interest, and listen to lectures on household problems by experts. In the forenoon both the farmers and their wives will meet in a session of general interest, while after the lunch the men and women will meet in separate sections, each with its own speaker. Excellent speakers have been engaged and there is every reason to expect that this department will prove to be as popular and useful as the other. Thus I am attempting to make the agricultural school the social and intellectual center of the newly aroused community life. The farmers' institute serves a double purpose, for it gives to the farmers what is best and newest in agricultural science and brings to the school the hearty support of those to whom it must look for its best pupils.

Nearly every phase of our local agriculture, such as corn, dairying, spraying, and feeding, are taken up in the course of the year and opportunity is afforded to have each topic brought up to date by its expert. Opportunity is also afforded for questions and discussions which often

prove more valuable than the lecture itself. Not all the time is given to scientists, but at each meeting some successful farmer is asked to give his method while the man of science gives the reason and principle. The agricultural classes attend the institutes and write reports of the lectures which serve as material for both English and agriculture. Some of the best English work of the school has been done on these agricultural topics.

Another successful line of work has been in the rural schools. As 75 per cent of the school children and practically all of the next generation of farmers attend the one-room rural schools, I have endeavored to reach them by such methods as would quickly interest them and were at the same time within the reach of my very limited resources. My efforts to improve rural schools are along two lines, the schools themselves and the future teachers who are now in the normal training classes.

As all farmers keep cows and raise corn, I chose milk testing and seed-corn selection as the best topics for my work in the rural schools. I borrowed a Babcock milk-tester from the Dairy Division of the U.S. Department of Agriculture, and with it and a small exhibit of choice seed corn I visit a country school each week. If the lesson is to be on milk testing the pupils bring samples of milk and with these I instruct both pupils and teacher in the operation of the test. Some of the parents are present giving me an opportunity to interest them in the work of the agricultural high school. I leave the machine at the school for a week so that all the pupils may become familiar with it and able to test the richness of the milk from each of their cows. The pupils then write me letters telling of their results, some of which I give here:

BUCKLAND, VA., November 9, 1911

DEAR SIR: We have been testing milk every other day this week. We have tested six samples of milk. We first put in the milk and then the acid, then turned for five minutes; then we took it out and filled it up to the neck of the bottle and turned it for two minutes; then took it out and filled it up to till all the butter-fat was up in the neck of the bottle; then turned for one minute more. The cows we tested were one of Doctor Brown's, two of Grahm's, one of Hall's, and our's.

I am nine years old.

WILL T. SWEENEY

BUCKLAND SCHOOL, VA.

BUCKLAND, VA., November 9, 1911

Prof. H. F. Buton, Manassass, Va.

DEAR SIR: We have been using your milk tester every day since you went away. We have tested six cows, there names were: Terry, 4.2 per cent, was Sweeney's; Mollie, 6.2 per cent, was Dr. Brown's; Chery, 4.7 per cent, was Grahm's; Boss, 4.5 per cent, was Hall's.

The way we tested it is: First, we would draw the milk up to that little rim on that long glass and then we would pour the acid into the milk and then we would shake it until it was black and then we would turn it five min.

Then we would turn it two min. more. Then we would pour the hot water in until all the fat was up in the neck of the bottle far enough so that we could see how much there was.

My name is John R. Sweeney—10 years old.

BUCKLAND SCHOOL, No. 1.

I have dozens of such letters and they show that the children know far more about the composition of milk than most of the parents. I have found this lesson the very best to introduce the subject of agriculture. It is interesting, almost spectacular, with the strong acid, the mysteriously hot bottles, the whirling wheels, and finally the clear yellow fat that tells that old "Blossom's" milk is twice as rich as that of "Spot." Still more important is the knowledge that it conveys to the parent as to the relative value of each cow. It is the beginning of the exact knowledge that makes for better farming.

At times I vary the lesson by giving one on corn judging. After this lesson it is much easier to teach about fertilizers and tillage. A seed-corn germination box is easy to make and to carry about. I prefer the sand-box type with strings for fences, as shown in Crosby's *Exercises in Plant Production*. The tiny fields appeal to the children and the sight of the plants growing in sand is much more convincing than the cloth and sawdust box. The sand-box type is, however, much heavier to carry about and more liable to spill than the Iowa tester made by marking cloth into two-inch squares, on each of which is placed five kernels taken from an ear of corn and the whole covered with a second cloth and sawdust to hold the moisture. As the use of fertilizers is almost universal and their purchase is one of the principal items of money outlay, I have found that a lesson on the composition and value of fertilizers is always appreciated. It may be made intensely interesting by showing the peculiar properties of phosphorus, potassium, and nitric acid.

After showing the spectacular side of the chemistry of fertilizers by a few experiments, such as lighting a fire with water, burning iron, and spontaneous combustion, I give an effective lesson on the arithmetic of fertilizers and the advantages of home mixing and co-operative buying.

I do not wish to convey the impression that the work is easy or the returns large. In those parts of the country where the soil is productive and the people prosperous and intelligent the work gives large returns. In such a neighborhood there is always some crop or product with which several of the patrons have made a success. In such a neighborhood and on such a topic I get a lively and intelligent response from the pupils which makes me feel sure the effort has resulted in a gain to the community and a strengthening of the bond between the farmers and their school. Not all the schools are so favorably situated. There is in the southern part of my territory a great belt of country between tidewater and Piedmont, called "The Forest," in which both agricultural and social conditions are most backward. Here my work of extension teaching is very difficult and the results meager. The population is sparse, the roads impassable, and agriculture unprofitable. When people derive their living from cross-ties and stave-bolts, it is a long step to interest them in Jersey cows and well-sprayed orchards. Yet despite the discouraging conditions I am doing much of my work among these schools, counting the greater need as an equivalent to the smaller returns.

This country-school work needs doing and if honestly done will bring support to the school and carry light to those who most need the help. Let no one who values comfort undertake this form of extension work, for there are long rides through deep mud, hurried starts, late returns, and cold rains as the usual accompaniments of the trips. I have found without exception that the teachers are glad to have me come and will co-operate with me in every possible way. The patrons when not apathetic are well pleased to have agriculture introduced in the school. Among the more thoughtful I find a widespread sentiment that their occupation has been slighted and neglected in the schools, and a full appreciation of any effort to improve conditions. There is urgent need for a wider and more sweeping regeneration of the rural school before the country child shall come to his rights, but if we wait for that time to come, many years may be lost.

I am making an effort to reach the teachers of country schools by my work with the normal class of the high school. To this class I

endeavor to give such lessons as will be most usable in their schools—testing the germination of seeds, tests for the simple food substances, starch, protein, fat, and sugar, the physical properties of soils, etc. The arithmetic of fertilizers is gone into in detail, as is the method of figuring out balanced rations. Especial attention is given to showing these future teachers how to set up and operate such experiments and demonstrations as will fix forcibly on the mind of the child some of the broader principles that underlie the practice of agriculture.

By milk and cream testing I have done much to bring the value of the school home to the farmers. I have spoken of the educational milk testing in the rural schools, but in the agricultural high school I test some 200 samples of milk and cream a year, the cream-shippers in particular finding it a means to avoid being cheated on the one hand and getting into trouble with the milk inspector on the other. If one of these men buys a cow he tests her milk that he may get a good one; if he sells a cow he tests her milk in order that he may sell a poor one. We have a cow-testing association of about a dozen enterprising dairymen who have stopped guessing about their cows. As the business of dairying grows this activity of the school will further increase. Several times in the past year I have had requests from local doctors for more complete analyses of milk, from which they are able to make up special modified milks for infant feeding.

An excellent barrel spray-pump furnishes means for another line of extension work. This pump is loaned out to people who wish to try spraying but have no suitable machinery. Spraying materials, such as concentrated lime-sulphur, arsenate of lead, and caustic-potash soap are furnished at cost. Some of the more advanced students go out and do small jobs of spraying, thus acquiring a proficiency that the limited equipment of the school cannot supply, and at the same time get people started at spraying who have never before attempted it. Last spring we used in this way more than a barrel of the concentrated lime-sulphur with arsenates in proportion. This year two barrels have been ordered and a still larger amount of work will be done. This is not a fruit-raising section and spraying is still an unusual practice, yet last year a dozen new barrel sprays came into the community as a result of our spraying propaganda. In many cases I have gone out to the orchards, set up the spray-pump, and instructed the owner in the adjustment of the nozzles.

In the village I am constantly called on to prescribe for the ailments of flowers, trees, and shrubs, and to destroy scales, plant lice, caterpillars, and miscellaneous "bugs." Outside of the village I am more and more frequently called on for expert advice on alfalfa, drainage, locations for orchards, sick cows, sick trees, and the like. Sometimes I can help and sometimes not, but the significant fact remains that there is a growing tendency on the part of the farmers to recognize the school as theirs, to be called on for all kinds of aid.

This year my extension work has been greatly facilitated by a fine stereopticon with a steel tank of compressed acetylene gas. After giving a lesson to a rural school I stay and give an evening illustrated lecture on some such topic as corn or dairying cattle. These evening meetings are always well attended and enable me to meet large numbers of people whom I can reach in no other way.

There are two excellent newspapers in the county, both of which have been liberal in their space and helped in their editorial columns. There is seldom a week when I do not have an article in one or both of these papers on some topic of timely interest. I review the lectures of farmers' institutes for those who were not there; I review scientific publications or give advice on the care of a crop or the control of some insect. These and other subjects furnish me a means of taking the benefits of the school out to the people on the farms who most need the aid and who are least able to secure it by regular instruction in the school.

If it be urged that my work begins at the top instead of at the bottom or that it is desultory, unsystematic, and without logical sequence, I must acknowledge the truth of the criticism. I can only say in defense that I am almost entirely without resources for teaching many topics, and that I am struggling to carry some message of a new and better agriculture to as many of my people as I can reach. I am doing all of this work in addition to the duties of a high-school director, teaching a class of twenty-eight in the last grammar grade, four classes in agriculture and three in chemistry in the high school, making six class periods a day, besides such allied activities as a Boys' Corn Club, thirty-two experimental plats, a forestry association, and a troop of Boy Scouts, so it can readily be seen what a man could do in extension work had he his whole time to devote to it.

V*B*. SHORT COURSES AND EXTENSION WORK IN AGRICULTURE FOR HIGH SCHOOLS—IN THE NORTH

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To those interested in education and who read the conflicting opinions relative to the success or failure of the agricultural teaching work in the various secondary schools of this country it is at once apparent that there is as yet no generally accepted policy as to what can and should be done by way of advancing agriculture through our secondary educational system.

It is not the intention in this paper to discuss an agricultural curriculum for a four-year high school. There is little at present to be added to the plans offered in the publications upon that subject already available from the U.S. Department of Agriculture and from the University of Wisconsin. The subject-matter to be discussed here has to do with the short courses and extension work in agriculture, for high schools and special secondary agricultural schools, now existing in these institutions in northern United States. The reader's personal judgment is depended upon for the analysis of values.

It is to be assumed that a competent and well-trained agriculturist is in control of the situation and that he is not to be hampered for want of authority or from lack of funds necessary to advance the work. The efforts of an institution must be along some well-defined lines, and (from an agricultural standpoint) we shall discuss the content of the work under four headings as follows:

I. Short Courses—
   1. Sixteen weeks young people's course
   2. Farmers' lecture course
   3. Farmers' one-week school
   4. Institutes and summer tours

II. Extension Work—
   1. Demonstrations on the individual farm
      a) Field
      b) Building
      c) Live stock

2. Organization of societies
   a) Cow-testing societies
   b) Grain- and corn-growing associations
   c) Social centers

III. INFORMATION BUREAU—
   1. Personal consultation
   2. Seed testing
   3. Butter-fat tests

IV. PUBLICATIONS—
   1. Bulletins and newspaper contributions

I. SHORT COURSES

1. Short courses of sixteen weeks are intended for those young people who can attend only that part of the year between the completion of the fall harvest and the beginning of the spring work. These young people are for the most part students who have had no institutional training for the business of farming which they expect to follow and who would be found in no school whatever were it not for these short courses now being offered.

The following two-year short course is effective in a Wisconsin secondary school as a continuation course for young men who are training for the business of dairying. It is assumed that they have completed the district school or that they have reached the age where a more mature judgment will aid them in their work.

FIRST YEAR—SIXTEEN WEEKS

Farm Crops: A study of seeds—crop rotation and economic factors.
Dairying: A study of the herd—the milk—the market.
Composition, penmanship, and spelling.
Civics and history.
Farm arithmetic and agricultural engineering.

SECOND YEAR—SIXTEEN WEEKS

Soils and commercial geography.
Stock judging and feeding.
Composition and spelling.
Bookkeeping and farm law.
Blacksmithing and power machinery.

These studies are definite and there is sufficient live material to create an interest for the work. This course has been successfully offered, beginning four weeks before the Christmas holidays and continuing through the sixteen weeks. A census covering three years of this work shows that, from the average of forty (40) students attending a local school for such a course, not one of these young men would have been in any school whatever had it not have been for such a special course of instruction.

2. The farmers' lecture course consists of a series of lectures upon agricultural subjects of interest alike to students and adults. This course covers one week at the local school and in Wisconsin the time of holding it is during the sixteen weeks' course when it is possible to secure speakers from the State University. This work not only gives instruction along special lines but it creates in those homes represented an added interest in the school work and materially increases the efficiency of all extension efforts.

3. The one-week farmers' school is for the adult farmer who is not a student but who is anxious to gather information that will aid him in increasing his financial returns.

During the one-week course regular classwork is given in subjects directly related to local farm problems, viz., corn and grain judging, milk and cream testing, stock judging, care and management of the herd, etc. This course has been well attended and where charges of one dollar ($1.00) were made conditional to enrolment the numbers have increased rather than diminished. All this seems to point to the fact that the farmer is willing to accept and that the time is ripe for a more general offering of agricultural teaching in our secondary schools.

4. Institutes and summer lecture tours are designated as instruction given at meetings held at points other than at the school. These meetings take place within striking distance from the school. They are usually afternoon or evening meetings held on Friday or Saturday when the school faculty can be present to discuss subjects of local interest.

The summer lecture tours are arranged in a series which allows of several meetings during the day at different points. The more successful of these meetings have covered periods lasting the greater part of a week and the speakers were taken over the circuit by automobiles. From three to five meetings could be held each day at points from ten (10) to

twenty (20) miles apart, and, at times, by using two autos, it was possible to begin a second meeting before closing the previous one.

To illustrate the effectiveness of such meetings in getting at the people, the attendance was kept during one of these three-days series held in northern Wisconsin and the count gave 2,700 adult farmers who listened to the speakers.

The local school has, in all these courses, an excellent opportunity to connect up with the state agricultural college and not only to increase the efficiency of the local institution but, through the school, to enable the college to become more effective in its aid to the farming community.

Thus far there has been presented here the definite instruction as given by the faculty and outside assistance to groups brought together for the purpose. The other lines of work promoted by the local institution are upon a co-operative basis and with the individual in direct relation to the farm.

II. EXTENSION WORK

Let it be understood that in all the agricultural work to be done by these secondary schools there shall be no attempt made to engage upon the experimental side as a part of the school's activities. The fieldwork is to be purely demonstrative of the already accepted agricultural practices and facts; it is in the pushing of them among the agricultural people that the school can do its most effective extension work.

One should absolutely condemn the use of land that, in connection with a secondary institution, is a "show off" proposition. A field is a valuable laboratory when used as such, but to have a line of plants growing in plots arranged so as to be agreeable to the eye and with no definite educational aim in view is poor pedagogy indeed.

1. Demonstrations on individual farms will be guided largely by the wants of the individual and by the agricultural development needed in a community. (*a*) The well-known improvement in the quality of corn and barley upon the farms of Wisconsin is the direct result of the extension work done in the rural sections of the state. The alfalfa demonstrations, the tuberculosis demonstrations, and other similar lines of work pushed by the secondary institutions in Wisconsin have shown in a remarkable manner what benefits can come through local demonstrations.

(*b*) As an example of what can be done by way of aiding the farmer

with his building one need only to point out the work of the several special agricultural schools in Wisconsin in the building of concrete silos. These schools furnish at cost the forms and plans for the construction of silos. The cost of construction has been reduced over one-third and, in some instances where the farmer had sufficient help or where two farmers joined forces, silos sixteen feet in diameter and thirty-six feet high were constructed for one hundred and eight dollars ($108), and this at points where the regular contract price had been over four hundred dollars ($400). In addition to the fact that the price has been so far reduced that a farmer of very limited means can now construct a silo (that most necessary adjunct to a dairy farm), it is also true that the concrete is superior to the old stave silo.

(*c*) The extension work in live stock from the secondary schools in Wisconsin has developed mostly along the lines of dairying, aid in selecting a desirable sire, aid in milk-fever cases, testing for tuberculosis, and in other matters where expert knowledge could assist the farmer with his live stock.

2. The organization of local community associations in the various districts is a most effective means of improving agricultural practices. Many an individual farmer who cannot be reached through public meetings will join an association to which his neighbors belong. (*a*) The cow-testing associations in Wisconsin have effectually shown thousands of our dairymen that certain cows were being kept at a loss, and that by clearing the herd of these "boarders" the profits are increased. The following quotation from a secondary institution in Wisconsin will illustrate the part it takes: "Cow-testing—To encourage the improvement of the dairy interest among farmers the school assumed charge of the cow-testing work and through its official testers is testing over 750 cows at the present time. A charge of $1.00 per cow per year is made for doing this monthly test work."

(*b*) The grain- and corn-growing associations organized in the rural districts have pushed the work of grain improvement among their members until Wisconsin as a state has come to be the source of the supply of seed corn and seed barley for many sections of other states.

(*c*) Social centers—a project now demanding much public attention—have been doing very effective work in practically every county in Wisconsin having a special school of agriculture. This was indeed the first satisfactory extension work of these schools toward reaching the farmers

in their homes. Small local clubs are organized and, stimulated by the occasional attendance of a member of the school faculty, they are a powerful influence in developing the natural resources of a community. The meetings are largely informal social occasions and, after discussing topics of special and timely interest, luncheons are served and often the entire neighborhood makes up the membership.

III. INFORMATION BUREAU

As a bureau of information relative to agricultural questions the office of the agricultural teacher is open daily.

1. The instructor seeks personal consultations with individuals having perplexing agricultural problems for solution. It is not expected that the teacher will always be able to give aid at the moment, but he is generally in a position to locate the desired information through correspondence or otherwise. Here again the splendid active assistance of the entire faculty of the State Agricultural College is available.

2. An increasing number of seed samples of all kinds are tested each year by the school. This work often saves a farmer from seeding his fields with noxious weeds, and the germination tests will insure him against using a seed of low germinating power. Many a farmer has wondered why his seed did not grow or has perhaps wrongly accused the crow of weakening his stand of corn.

3. In a dairy country we have come to measure our milk and cream by the percentage content of butter-fat. The method of determining this is, thanks to Dr. Babcock, general property, yet but a small number of farmers can operate the test. Here then is a valuable aid that the school, through its laboratory, can give to the individual farmer who brings his sample of milk or cream for analysis. Cases are in evidence where dishonest purchasers are trimming the butter-fat test of their patrons. If a local school stands ready to make a fair fat-test at any time there certainly is no objection to be offered by the honest dealer, and on the other hand it is a check upon dishonest practices where these agricultural interests are being victimized.

IV. PUBLICATIONS

Regular bulletins and contributions to local newspapers are necessary factors in the extension of agricultural interests. The publications answer the local pressing questions without delay. They are read with

added interest in all sections where the local school has been active; thus personal contact is taken advantage of to a high degree.

It should be understood that all extension work to be most effective should be preceded by a careful study and analysis of the community and its needs.

Educators disagree as to whether these short courses and extension work in agriculture shall be given in a special secondary school created for the purpose or be offered by the present high schools. A consideration of the arguments favoring the special school leads one to believe that when the high schools shall offer these short courses of from twelve to sixteen weeks during the winter they will have taken away one of the stock arguments favoring the special agricultural school as found in Wisconsin; indeed this special school will have served its purpose in that it has forced upon educators the recognition of this work. This, however, can be made possible only when the teaching profession shall have accepted the theory that any study is cultural that trains for social efficiency in the individual. The school that is training the youth to become a better farmer and a more useful citizen is certainly contributing as much to society as a school that is methodically clogging the natural resources of a youth by giving him "cultural subjects for culture's sake."

Today one need not be alarmed if he finds himself leaning toward utilitarianism in his views relative to educational subjects; indeed it is quite permissible, and financial returns can well be a factor in the general construction of any modern school curriculum.

On the other hand those directly interested in the executive side of agricultural short courses and extension work must pause in contemplation of the situation. Superficial work cannot long endure, and extension work in the hands of a group of easy talkers with a ready response to every question is often incomplete in its ultimate effectiveness. Extension work is not intended as an advertising bureau, but the fundamental keynote should be "service to men." Leaders with depth of thought are taking hold and improvement in methods and men means a higher ultimate efficiency.

In this work the agricultural people have been open to the accusation of being spectacular and possibly arbitrary at times. If this is true the only defense is that the ends justified the means. The appeal to the farmer in all this educational work has been from the standpoint of

financial returns; the dollar has always been uppermost. Educators of a conservative frame of mind have condemned this attitude as unprofessional, but in the face of all this the movement has been getting results. It is even true that the farmer has increased his bank account because of this aggressive work in the introduction of a new agriculture, and it is equally true that the salary of the conservative educator has not increased in like proportion. The farmer and his home surroundings are improved to such an extent that his social status is very acceptable to the most of us.

Is it necessary to establish new institutions in pushing this development or shall the secondary agricultural work be most effective when our entire extension system of education is sending its current of knowledge to the people over lines of contact already installed?

The future position which agriculture is to occupy in our secondary educational system is as yet an unsolved problem. Of one thing we are quite sure, that education must yield to the growing demand that agriculture have a place in our secondary schools and if the high schools will insist upon dwarfing the importance of agricultural instruction and of holding to the attitude of *toleration* rather than to that of *sympathetic aid* and *aggression*, then will they surely fail because of their narrowness, and the special agricultural school will sweep over the country. The struggle is on. Will the high school rise to its opportunity? We believe it will.

VI*A*. IN PUBLIC HIGH SCHOOLS SHOULD AGRICULTURE BE TAUGHT AS AGRICULTURE OR AS APPLIED SCIENCE?

WILLIAM R. HART
Professor of Agricultural Education, Massachusetts Agricultural College, Amherst, Mass.

In arriving at an answer to the question as to whether agriculture should be taught as agriculture or as applied science two assumptions are imposed: first, that agriculture is teachable as such, and second, that it is also teachable as something else, i.e., as applied science. One's mental equipment and mental attitude toward both the subject and what it means to teach will influence his answer. These points of view are suggested as a basis for the discussion which follows. What is the probable attitude of the practical farmer without scientific training? What is the probable attitude of one trained in science without practical experience in the various arts of agriculture? What is the attitude of the learner who has had some practical experience in farming? What is the attitude of the learner who has had no experience in farm arts? The teaching of agriculture must mean something different to each of these persons.

If the practical farmer were asked to give his idea of what it means to teach agriculture to a class of high-school boys, his answer would probably be reducible to some such formula as this: "Teach the boys how to do the various things needful for carrying on the farm operations." If the farm is devoted to crop raising, these operations would be largely confined to the arts of tillage, planting, harvesting, storage, and marketing. It would also include, more or less incidentally, the care and handling of horses and the use of tools and machinery. If, however, the farm were primarily devoted to stock raising, the relative importance of the crop-raising arts and animal husbandry would be reversed. The emphasis would tend to be placed on the animal aspect, while raising crops would become incidental. In either case the farmer-teacher would place the greater emphasis upon the art of doing things. This

seems inevitable from the nature of his training. The more skilful he is himself, the more prominent would become the art aspect of his instruction. The student under such influence would easily become a trained operative in agriculture, rather than an educated agriculturist. The instruction would be direct, immediate, practical, and narrow, because of the circumscribed outlook and limited insight of the teacher.

If the same question, "What does it mean to teach agriculture in a high school?" were put to a man trained in science, the answer would in all probability tend toward the formula, "You cannot teach the application of science until you have taught the science." This attitude would postpone the study of agriculture till after a study of the sciences which are to find their application in agriculture. A foundation knowledge of scientific methods and of scientific principles would be insisted upon as a prerequisite to their application in the art of agriculture. The reason for doing things would be dominant. The laws governing the activities of Nature in the production of plants and animals would be magnified. The art of plant culture and of animal husbandry would be correspondingly minimized. The attitudes of the "farmer-teacher" and the "science-teacher" are antithetical. The "science-teacher" would become so absorbed in one or two sciences that agriculture would be touched incidentally, or as a student recently expressed it, "accidentally." The "farmer-teacher" would become so intent upon agriculture that he would lose sight of the underlying sciences. He could not see botany for so many vegetables, nor zoölogy for so many animals, nor chemistry for so much manure, nor physics for so much tillage. The "science-teacher" would be as constantly losing sight of the apple in pomology, the horse or cow in zoölogy, the fertilizer in chemistry, and soil drainage in physics. In very truth, the teacher of agriculture must be a man of perfect balance.

What of the student? One type of student brings to the study of agriculture a body of knowledge which we call practical experience. If the experience (practice) has been good the knowledge is valuable. If the practice has been bad the knowledge gained by it is injurious, because of the tendency of acquired habits to stay fixed, whether they are habits of thinking or habits of action. A person in this state of mind will approach the study of agriculture prejudiced with the idea that the way things have been done by himself in the past is a justification for doing them the same way in the future. The superficially

reasoned-out modes of operating the arts of agriculture from the narrow range of individual experience makes the mind inert. Opposed to this mental inertia is the scientifically reasoned-out justification for doing the thing at all. The practical craftsman justifies the art by the mode of operating it; the scientific operator, by the reason for the operation. This is the point at which theory and practice often come into conflict. And there is nothing which damages a theory so much as its inability to work.

This conflict between theory and practice is inevitable. It has two reasons for occasionally happening. One lies in the domain of each of the parties to this age-long controversy. Theory, on the one hand, is only a way of expressing in general terms one's idea about a group of facts or the reasons for a course of action. The idea, or conclusion, or generalization may be based upon too small a number of factors, or by giving undue weight to some factors and underestimating or ignoring others. On the other hand, practice is only the customary way of doing things. The method finds its chief justification in tradition. Its chances for being in error lie in the fact that the inception and continuance of a given practice often rest upon too narrow a range of experience. The more completely one justifies his practice by his individual experience alone, the less plastic is his mind in the presence of a disturbing theory, however well fortified the theory may be by scientific experimentation.

What of the person who comes to the study of agriculture unskilled in its arts and ignorant of the fact that, as a mode of life, it is in any way related to science? This state of mind is the virgin soil for exploitation by both the misnamed practical man and the much abused theoretical man. Here each congratulates himself that he has before him a clean slate on which he may write at will. One rejoices that here is a student innocent of the habits of a faulty practice; the other, that the student is unprejudiced by false theories.

The ideas in the foregoing suggestions seem to stand at the threshold of the discussion of the question as to whether agriculture should be taught as agriculture or as applied science. Taking the question at its face value as thus stated, the answer is easy. In fact, it is too easy for safety. A brief argument may be formulated in favor of teaching it as "applied science" as follows: "Agriculture is applied science, therefore it can only be taught as applied science." This mode of answering the

question is quite satisfactory to some minds. It fails short of being entirely satisfactory because it ignores two or three important considerations. These may be stated in the form of questions.

1. What are the motives for studying a science?
2. What are the motives for studying agriculture?
3. When is a science applied?

One other consideration must be taken into account whether one is conscious of it or not. That is, what function is the course of instruction supposed to perform for the pupil of high-school age?

First, as to the motives for the study of science. In these days science has reached so great a development in so many directions that it has in some of its phases become universal as a school study. Science does not get so much of the school time devoted to it as the languages do, but some aspect of it is taught in practically all schools. Its universality as a school subject seems to justify its claim for having educational values. Science must have a high degree of mental sustenance to have become so universal. What these mental values are need not be dwelt on here. It is enough to say that many pursue science not for the sake of any use they expect to put it to, but for the pleasure its possession gives them in their leisure and the insight it gives into the mysteries of the world of Nature about them in their daily work. In other words, science as a study has justified itself as a cultural and humanizing study of the highest order.

Correlative with this, science has its utilitarian aspect. Whatever may be claimed for it in giving the mind freedom from prejudice, and adding to one's joy of living, science will always remain a most practical study. Its practicalness lies in its application to things that are seldom thought of as being scientific in themselves. This is especially true of the theme in hand, namely, agriculture. Agriculture, which has been carried on so many generations by men untrained in science, is the latest of the great human vocations to benefit by the message science has to offer for man's welfare. The fact that the arts of tillage and husbandry are so simple as arts discourages the attainment of a high degree of skill. The application of the principles of science or of scientific method to an occupation so wanting in skill has always met resistance. This resistance seems to grow out of the fact that the workman unschooled in the science of his craft regards his work as a thing by itself and especially as a thing apart from science.

Science in the broad sense of the term has a greater message for agriculture than for any other single human industry. To put it a little more accurately, the various sciences have a multitude of messages for the numerous arts that are included under the word agriculture. There is hardly a branch of learning included in the term science which does not stand ready with a helpful message for the advancement of agriculture. Physics in its application to tillage, chemistry in the analysis of fertilizers and animal nutrition, biology in the exemplification of the laws of life, meteorology in its seasonal control of the year's succession of activities, and geology with its productive elements, the basis of soil-study as well as of plant production, all contribute to the upbuilding of a scientific agriculture.

To weigh these different bodies of scientific knowledge and to give to each its proportionate share in the advancement of agriculture requires a mind of unusual grasp.

To contend that even the simplest elements of each of these sciences should be studied with a view to their use as applied sciences afterward would preclude the possibility of the study of agriculture in any form during the high-school period. When viewed from the standpoint of the sciences involved in it, the teaching as well as the study of agriculture becomes the most complicated educational problem the public schools have ever undertaken to master.

Instruction in agriculture has two distinct phases. One involves the process of learning the art of doing things connected with the field, the garden, the barn and feed yard, the orchard, the meadow, the wood lot, and the toolhouse. The other phase of agricultural instruction relates to the sciences on which these several arts depend for their explanation. Art and science instead of being opposed, are more intimately connected in the study of agriculture than in any other subject now offered in the schools, unless it is language. The vitality of language as a school study through the centuries is due to the intimate blending of the two arts of speaking and writing with the two sciences of grammar and logic. When we once become conscious of this indissoluble tie between the arts of communication and the sciences of human thinking, no school reform will ever lay violent hands on grammar and logic.

Agriculture is much more complex. Instead of embracing only two, it has a large group of arts. Instead of being explained by only two sciences, agriculture lays tribute on nearly every science known to man.

And when the teacher of either agriculture or of science once becomes conscious of this ganglionic tie between the agricultural arts and all of the sciences he will teach science less "for the sake of science" and more "for the service of man." Now, the knowledge embraced within the domain of a given science has, in most cases, been so well systematized that a serial group of lessons may be arranged for orderly school work with very little trouble. One lesson follows another in causal or sequential order because of the relation of their subject-matter one to another. Progress is in the nature of motion in a straight line. Lessons in agriculture have little if any logical order so far as being dependent upon each other, in a causal way. It is on this account that lessons in plant culture may begin with the fruit, the roots, or the stem as is convenient. In case the fruit is taken as a starting-point the succeeding lessons, instead of running in a straight line like a series of causes and effects, or a group of closely related sequences, represent a group of sciences with the first lesson as a center of radiations. These sciences may have fairly well-defined lines separating them from each other, but the lesson on the fruit of a given plant is inseparable from either of them. It is an undivided part of each science. And the series of lessons on the fruit must go from science to science until the circuit is complete. Take an example:

The meagerest sort of a lesson on the apple would include such features as variety, form, color, size, and uses. But its variety is identical with so much of its botany; its form is involved in geometric mathematics; its color is a matter of physics, chemistry, and meteorology, and possibly of geology; its size is due in part to variety, which is botanical, in part to climate, which is meteorology, in part to altitude and latitude, which are geographical, in part to nourishment, which is physiologico-botanical; its uses first as food, second as an article of commerce, third as a source of power in the form of alcohol, identify the study of the apple with the sciences of domestic economy, economics, and political economy. From this it is plain that a lesson on the apple merely as a fruit, instead of being the beginning of a series of lessons following one after another in a dependent order, becomes the center for progress in the form of a spiral rather than of a straight line. The apple is the converging point for seven or eight well-defined sciences. And the study of the apple that confines itself to the most obvious features of it, i.e., variety, form, color, size, and uses, must cross-section each of the seven

or eight sciences. Each science in turn gives its message toward the explanation of the apple.

The apple is serving a double rôle in this illustration—it is both a center for the convergence of a group of sciences and at the same time a center of radiation into a surrounding group of sciences. And the question may now be put, as to whether the apple should be studied as a means of introducing a student to the sciences, or whether the sciences should be studied as a means of understanding the apple.

The field from which similar illustrations might be drawn is as wide as the whole field of agriculture. Examples may be found in animal life, in the garden, the forest, and in the field. Whatever object is taken, whether an apple, a potato, an ear of corn, a hen, a horse, or a forest nut, the same group of sciences must be looked to for principles of explanation and for guides to conduct in dealing with the object. These objects of study are tied up with human interest. This is what makes them agricultural. Science for science's sake is unrelated to human interests. Botany as such never touches man. Zoölogy as such only touches man as an animal, and as a science is unrelated to human interests until it deals with horses and hogs and hens, not because they are animals but because they are man-nurtured animals. Botany allies itself with human interests only when it deals with plants as they are related to human welfare. The human-interest aspect of the physical and biological sciences is what makes certain substances like soil, water, and air, and a few plants and animals, agricultural. To teach these things apart from their human interest makes them simply objects of science and non-agricultural. It would, therefore, appear that from the standpoint of the close relation of the farm arts to the sciences, or from the standpoint of human interest, agriculture should be taught as agriculture and not as an applied science.

VI*B*. IN THE PUBLIC HIGH SCHOOLS AGRICULTURE SHOULD BE TAUGHT AS AGRICULTURE, NOT AS APPLIED SCIENCE

G. F. WARREN
Professor of Farm Management, Cornell University, Ithaca, N.Y.

A very large part of our agricultural instruction may be combined with other sciences and will serve to enrich these studies. I believe that agricultural illustrations will almost revolutionize the teaching of science, which is in danger of becoming too academic. So soon as we get a science well systematized with definite sets of laboratory exercises, which we feel are fixed for all time, we have lost one of the most useful features about science, that is, that it studies the earth and the civilization that surrounds us—conditions that are ever changing.

While teaching capillarity in physics, the soil offers a most valuable illustration. While teaching friction, such questions as the relative draft of riding and walking plows may be cited. A well-constructed riding plow will carry a man and draw easier than will a walking plow, because a third of the draft of the walking plow is due to friction on the bottom of the furrow, whereas with the riding plow, the friction is placed on the axle and the axle is greased. Another illustration might be given of the reason why placing the double-tree below the tongue will enable a team to pull a heavier load than if the double-tree is high, as in the case of carriages. The first thing that gives way when a horse fails to pull a load is the feet. The horse cannot stick to the ground, but if hitched low a part of the load will pull down on the back, making the horse "heavier" and the friction greater, and will enable the horse to pull more. This is also one of the reasons why a draft horse should be heavy.

While teaching bookkeeping in rural high schools, farm accounts rather than operations involving some large city business should be used for at least a part of the illustrative material. Farm accounts are more complicated than are the accounts for city business. They would, therefore, better meet the objection that some people have to bookkeeping—that it does not require sufficient mental application.

I know of no better ecological illustration for the botanist than the lime requirement of plants. Alfalfa may fail for lack of lime where clover thrives; clover may fail and timothy yet thrive; timothy may fail and still redtop may grow. Similar illustrations for these and other sciences may be multiplied indefinitely.

Since agriculture is based on all the sciences, some persons have argued that it can best be taught by having the principles presented in the separate sciences, as illustrated above, rather than by having a new subject. This argument may sound logical, but it is utterly impracticable. Our textbooks of science are not written by persons who know much about agriculture. As soon as they go beyond a few very general illustrations they are more likely to emphasize some popular fallacy than to give real scientific principles. Agriculture is a new and rapidly growing science. To keep all the textbooks up to date would be an impossible task. It will be difficult enough to keep the textbooks on agriculture up to date without having to revise the agriculture in the science books every year. A good textbook of chemistry is good the world over. It ought to include illustrations from agriculture as well as from all other fields of human experience to make it good chemistry, but such illustrations must be very general. Agriculture is more local in its pedagogy. The cotton plant and the apple may illustrate a certain point equally well, but in teaching agriculture we will want to use the illustration that fits the region.

Our teachers of science are not likely ever to know enough about agriculture to be able to go very far with the introduction of agriculture into the sciences. Many good chemistry teachers come from the cities and villages and know nothing about agriculture. No teacher is likely to be of much use in teaching agriculture who has not had a good farm experience as well as a good course in this subject.

For a generation the agricultural colleges tried to have agriculture taught by botanists, chemists, etc., but not until they added professors of soils, crops, and cows were their agricultural teachings of much value to prospective farmers. The high schools will save time if they profit by these many years of experience. But there is another reason why agriculture must be a separate subject, if very much is to be accomplished. Agriculture is a science in itself—a science in part founded on other sciences, in part independent, just like all sciences. It is certainly as much an independent science as is the science of medicine. We

should not think of expecting the teachers of botany, zoölogy, chemistry, and physics to train physicians. No matter how many medical illustrations these teachers may use, we must always have separate departments and separate instruction that will correlate all these sciences into a single unit—the science of medicine. Similarly we must have all the sciences correlated into the unit—agriculture.

Let us take a single illustration. How would the teaching of crop rotation proceed if there were no separate subject of agriculture? Crops are rotated:

1. To control weeds.
2. To control insects.
3. To control fungi.
4. To keep up the humus supply.
5. To secure the benefits of growing grasses and legumes on each field.
6. For convenience in working.
7. For control of toxic substances.

Possibly the botany teacher might mention weeds, fungi, legumes, and grasses in this connection, and might even discuss toxic substances. The teacher of zoölogy might mention crop rotation as a means of controlling insects. Certainly no science teacher would consider the convenience in working that comes from growing crops in a certain order, yet this is the chief reason that leads farmers to rotate crops. But if all these points were mentioned at various times and in this disconnected way, it would not teach crop rotation.

More important than the reasons for crop rotation is the planning of cropping systems adapted to particular farms. This does not belong in any of the sciences except the science of agriculture.

Perhaps no error is more prevalent than the idea that agriculture is nothing but the application of other sciences. Even some agricultural colleges still fail to grasp the idea that agriculture is itself a science. Probably half of the best teaching of agriculture is not the application of any science except the science of agriculture. The laying of a tile drain is not physics. The training of a colt is not zoölogy. The grading and packing of apples is not botany.

The selection of a farm is one of the most important decisions in the life of a farmer; such a selection should be based on scientific principles. The decision as to the best type of farming for the region, the stocking

and equipping of the place, the cropping system to be followed, are of the utmost importance to the farmer. But to what science do these things belong except the science of agriculture? A mistake in one of these cannot be overcome by any knowledge of life histories of insects or ideas on how plants grow.

Any school course that pretends to prepare for farming must teach the usual sciences and ought to include in these as many agricultural illustrations as possible, but to try to give agricultural training without agriculture as a separate subject is like *Hamlet* with Hamlet left out.

CONSTITUTION OF THE NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

(Revision Adopted in Chicago, February, 1909)

ARTICLE I

Name.—The name of this Society shall be "National Society for the Study of Education."

ARTICLE II

Object.—Its purposes are to carry on the investigation and to promote the discussion of educational problems.

ARTICLE III

Membership.—SECTION 1. There shall be three classes of members—active, associate, and honorary.

SEC. 2. Any person who is desirous of promoting the purposes of this Society is eligible to active membership and shall become a member on approval of the Executive Committee.

SEC. 3. Active members shall be entitled to hold office, to vote, and to participate in discussion.

SEC. 4. Associate members shall receive the publications of the Society, and may attend its meetings, but shall not be entitled to hold office, or to vote, or to take part in discussion.

SEC. 5. Honorary members shall be entitled to all the privileges of active members, with the exception of voting and holding office, and shall be exempt from the payment of dues.

A person may be elected to honorary membership by vote of the Society on nomination by the Executive Committee.

SEC. 6. The names of the active and honorary members shall be printed in the *Yearbook*.

SEC. 7. The annual dues for active members shall be $2.00 and for associate members $1.00.

ARTICLE IV

Officers and Committees.—SECTION 1. The officers of this Society shall be a president, a vice-president, a secretary-treasurer, an Executive Committee, and a Board of Trustees.

SEC. 2. The Executive Committee shall consist of the president and four other members of the Society.

SEC. 3. The president, vice-president, and secretary-treasurer shall serve for a term of one year. The other members of the Executive Committee shall serve for four years, one to be elected by the Society each year.

SEC. 4. The Executive Committee shall have general charge of the work of the Society, shall appoint the secretary-treasurer, and may, at its discretion, appoint an editor of the *Yearbook*.

SEC. 5. A Board of Trustees consisting of three members shall be elected by the Society for a term of three years, one to be elected each year.

The Board of Trustees shall be the custodian of the property of the Society, shall have power to make contracts, and shall audit all accounts of the Society, and make an annual financial report.

SEC. 6. The method of electing officers shall be determined by the Society.

ARTICLE V

Publications.—The Society shall publish *The Yearbook of the National Society for the Study of Education* and such supplements as the Executive Committee may provide for.

ARTICLE VI

Meetings.—The Society shall hold its annual meetings at the time and place of the Department of Superintendence of the National Education Association. Other meetings may be held when authorized by the Society or by the Executive Committee.

ARTICLE VII

Amendments.—This constitution may be amended at any annual meeting by a vote of two-thirds of voting members present.

MINUTES OF THE MOBILE MEETING OF THE NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

(Held in the Elks' Club, Mobile, Ala.)

DISCUSSION OF YEARBOOKS, WEDNESDAY, FEBRUARY 22, 7:30 P.M.
BUSINESS MEETING, FRIDAY, FEBRUARY 24, 4:30 P.M.

President Carroll in the Chair
S. Chester Parker, Secretary

The Wednesday evening meeting was devoted to a discussion of the *Yearbooks*, Part I, "The City School as a Community Center," Part II, "The Rural School as a Community Center." The following persons participated in the discussion: Mr. Lee F. Hanmer, of the Russell Sage Foundation; Professor B. M. Davis, Miami University, Oxford, Ohio; Superintendent Davidson, of Omaha, Neb.; Professor Baldwin, of the Hyannis, Mass., Normal School; Superintendent Cooke, of Baltimore County, Md.; Professor Strayer, of Teachers College, New York City; Professor Sutton, of the University of Texas; Superintendent Hamilton, of Allegheny Co., Pa.; Professor Forbes, of the University of Rochester.

Most of the speakers held definitely to the subject under consideration, describing practical examples of the work with which they were acquainted. Professor Forbes, on the invitation of President Carroll, delivered a carefully prepared, twenty-minute summary of the practical social significance of the work that is being done to make the schools real community centers.

The President announced the following Nominating Committee: Professor W. S. Sutton, of the University of Texas, Professor Manfred J. Holmes, of Normal, Ill., Superintendent J. H. Van Sickle, of Baltimore, and Superintendent A. S. Cooke, of Baltimore Co., Md.

Friday, February 24, 4:30 P.M. was chosen for the business meeting. The following business was transacted at the Friday meeting:

The minutes of the Indianapolis meeting were read and approved.

The report of the nominating committee was received and adopted, the following officers being elected:

President, Professor W. C. Bagley, of the University of Illinois.

Members of the Executive Committee: Superintendent W. H. Elson, Cleveland, Ohio, for four years; Professor G. D. Strayer, of Teachers College, to fill remaining two years of the unexpired term of Professor Suzzallo who had resigned on account of stress of administrative work.

Trustee, R. P. Halleck, Louisville, Ky.

The report of the Secretary-Treasurer was received, ordered to be printed in the next yearbook. It was ordered that the accounts of the Secretary be audited by the Trustees.

Professor C. H. Judd, chairman of the Board of Trustees, suggested the advisability of trying to arrange a subscription combination with the *Teachers College Record* and the *Elementary School Teacher*, whereby the publications of the Society would be given wider circulation and the members of the Society receive greater value for their dues. By motion, the officers of the Society were authorized to canvass the possibilities of such a combination and submit it to the active members of the Society by mail for referendum vote.

Following the suggestion of President Carroll, the meeting voted in favor of the following topics for the 1912 yearbooks: Part I, "Industrial Education in City Schools;" Part II, "Agricultural Education;" the yearbooks to consist largely of description of typical experiments along these lines by specialists who are actually engaged in the work.

Meeting adjourned.

CLARENCE F. CARROLL, *President*
S. CHESTER PARKER, *Secretary*

REPORT OF SECRETARY TO EXECUTIVE COMMITTEE AND TRUSTEES AT THE MOBILE MEETING

Number of Members December, 1910:	Active	141
	Associate	97
	Total	238

Financial Condition of the Society

Resources.—Twenty-seven active members and 21 associates were delinquent for 1910 on December 31. This leaves a probable paying membership as indicated in the following table which includes income from publications sold by the University Press:

	Number	Total
Active members paying $2.00	114	$228.00
Associate members paying $1.00	76	76.00
Income from members		$304.00
From University Press, June, 1910	$504.66	
From University Press, January, 1911	259.17	
		763.83
Estimated total annual income		$1,067.83

The income from the sale of publications is approximately two and one-half times that from members.

Estimated Average Annual Expenditures

Manufacturing and distributing two Yearbooks	$600.00
Editorial expense for same	60.00
Secretary's salary	100.00
Stationery, printed notices, etc.	20.00
Postage	20.00
Typewriting	10.00
	$810.00

This estimate may be a little too low as it indicates a probable annual profit of over $200.00.

Analysis of Income from Publications

The largest items in the sale of publications by the University Press during 1910 were the following:

IX–1.	Wood, *Health in Education*	$183.15
VIII–1.	Henderson, *Sex in Education*	61.20
VIII–2.	Henderson, *Sex in Education*	63.90
Dewey,	*Ethical Principles*	107.05
Dewey,	*Interest*	86.10
Bound Volume, National Society		24.00
Bound Volume, Herbart Society		24.00
VII–1.	Lowry, *Professional Improvement of Teachers*	21.15
V–2.	Cubberly, *Certification of Teachers*	29.16
VI–2.	*Kindergarten and Elementary Education*	23.04
VII–2.	*Kindergarten and Elementary Education*	19.35
	Total	$642.10

These sales constitute 84 per cent of the total sales.

The following items are especially noteworthy:

1. Dewey's two pamphlets realize as much as 63 per cent of the membership dues.

2. Henderson's books have returned in sales 80 per cent of their original cost (cost about $560.00; sales 1909–10, $447.00).

3. Wood's book has realized 40 per cent of its cost in the first year of sales (a very expensive book; manufacturing cost, $300.00; editorial expense, $135.00; total, $435.00).

Respectfully submitted,

S. CHESTER PARKER, *Secretary*

FINANCIAL REPORT OF THE SECRETARY-TREASURER JANUARY 1, 1911, TO DECEMBER 31, 1911

RECEIPTS

Balance on hand January 1, 1911			$733.69
Sales by the University Press—			
June to December, 1910	$259.17		
January to June, 1911	387.46		
		$646.63	
Interest on savings' bank account		9.56	
Dues from members (current and delinquent)—			
Active	$333.40		
Associate	94.10		
		$427.50	
Total income for the year			$1,083.69
Total including initial balance			$1,817.38

EXPENDITURES FOR 1911

Usual Expenses

Publishing and distributing two Yearbooks—			
Printing *Tenth Yearbook*, Pt. I (City Social Centers)		$217.13	
Printing *Tenth Yearbook*, Pt. II (Rural Social Centers)		215.99	
Editorial expense, *Tenth Yearbook*, Pt. II (Davis)		15.95	
Mailing above Yearbooks		32.00	
Reprints for contributors		35.20	
Total cost of usual Yearbooks			$516.27
Secretary's office—			
Secretary's salary		$100.00	
Mobile traveling express		46.00	
Typewriting	$31.39		
Stationery	14.08		
Stamps	20.50		
Express	1.30		
Telegrams	5.25		
Exchange	1.85		
Total running expenses		$74.37	
Total for Secretary's office			$220.37
Other expenses—			
Mobile stenography for President Carroll		$2.24	
Refunds of excess paid on dues		2.00	
Total other expenses			$4.24
Total usual annual expenses			$740.88

Unusual Expenses

Printing a third Yearbook (*Ninth Yearbook*, Pt. II, Wood, *Nurse in Education*, should have been issued in 1910)	$176.90	
Mailing same	15.23	
Manufacturing 100 bound volumes (done every five years)	45.00	
Reprinting *Eighth Yearbook* (Henderson, *Sex*)	114.80	
Reprinting *Ninth Yearbook* (Wood, *Health*, and *Nurse in Education*)	133.00	
Total unusual expenses		$484.93

SUMMARY

Usual annual expenses	$740.88	
Unusual expenses	484.93	
Total expenditures, 1911		$1,225.81
Balance on hand December 31, 1911		591.57
		$1,817.38

S. CHESTER PARKER, *Secretary-Treasurer.*

LIST OF ACTIVE AND HONORARY MEMBERS OF THE NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

ACTIVE MEMBERS

Axline, Howard E., Principal Hicks School, Cleveland, Ohio
Bagley, William C., University of Illinois, Urbana, Ill.
Baldwin, Bird T., State University, Austin, Tex.
Beegs, A. H., Whittier School, Denver, Colo.
Benedict, Ezra W., Walden, Orange Co., N.Y.
Blaine, Mrs. Anita McCormick, 344 East Erie St., Chicago, Ill.
Bolton, Frederick E., 1019 College St., Iowa City, Ia.
Boyer, Charles, Superintendent of Schools, Atlantic City, N.J.
Bradford, Mrs. Mary D., Superintendent of Schools, Kenosha, Wis.
Briggs, Thomas H., Jr., 523 West 124th St., New York City
Brooks, Sarah C., Principal of Training School for Teachers, Baltimore, Md.
Brooks, Stratton D., Superintendent of City Schools, Boston, Mass.
Brown, George A., School and Home Education, Bloomington, Ill.
Brown, John F., Teachers College, New York City
Brown, J. Stanley, Superintendent of Township High School, Joliet, Ill.
Brumbaugh, Martin G., Superintendent of Schools, Philadelphia, Pa.
Bryan, W. J. S., 6102 Waterman Ave., St. Louis, Mo.
Buchner, Edward F., Johns Hopkins University, Baltimore, Md.
Burnham, W. H., Clark University, Worcester, Mass.
Burruss, Julian A., State Normal and Industrial School for Women, Harrisonburg, Va.
Bush, Ira Benton, Superintendent of Schools, Parkersburg, W.Va.
Call, Arthur Deerin, 74 Gardner St., Hartford, Conn.
Cammack, I. I., Principal of Kansas City High Schools, Kansas City, Mo.
Carroll, Clarence F., 8 Girton Place, Rochester, N.Y.
Chadsey, Charles E., 1767 Humbolt St., Denver, Colo.
Chandler, J. A. C., Superintendent of Schools, Richmond, Va.
Claxton, P. P., Bureau of Education, Washington, D.C.
Coffman, Lotus D., State Normal School, Charleston, Ill.
Condon, Randall J., Superintendent of Schools, Providence, R.I.
Cook, Albert S., County Superintendent of Schools, Towson, Md., Sta. A.
Cook, John W., President N. I. S. N. S., De Kalb, Ill.
Cooke, Flora J., Francis W. Parker School, 550 Webster Ave., Chicago, Ill.

Cubberly, Ellwood P., Leland Stanford Junior University, Stanford University, Cal.
Damon, L. A., Fulton, Ill.
Davis, B. M., Miami University, Oxford, Ohio
Davis, Emma C., 2024 East 46th St., Cleveland, Ohio
Deahl, Jasper N., University of West Virginia, Morgantown, W.Va.
Dearmont, Washington S., President State Normal School, Cape Girardeau, Mo.
De Garmo, Charles, Cornell University, Ithaca, N.Y.
Doyle, Miss Mary E., Holy Name Normal School, Capital Hill, Seattle, Wash.
Dyke, Charles B., 961 Tenth St., Boulder, Colo.
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Eby, Frederick, State University, Austin, Tex.
Edmund, Gertrude, Cohocton, N.Y.
Elliott, Edw. C., University of Wisconsin, Madison, Wis.
Ellis, A. Caswell, University of Texas, Austin, Tex.
Elson, William H., Superintendent of Schools, Cleveland, Ohio
Farrington, Frederic E., Teachers College, Columbia University, New York City
Felmley, David, President of Illinois State Normal University, Normal, Ill.
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Frederick, J. M. H., Superintendent of Schools, Lakewood, Ohio
Frost, J. M., Superintendent of Schools, Muskegon, Mich.
Giddings, Margaret, Supervisor of Kindergartens, Denver, Colo.
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Greeson, Wm. A., Superintendent of Schools, Grand Rapids, Mich.
Groszmann, Maximillian, P. E., Plainfield, N.J.
Gwinn, J. M., Superintendent of Schools, New Orleans, La.
Halleck, Reuben Post, Principal Boys' High School, Louisville, Ky.
Hamilton, Cora M., State Normal School, Macomb, Ill.
Hanus, Paul H., Harvard University, Cambridge, Mass.
Harris, Ada Van Stone, Assistant Superintendent of Schools, Richmond, Va.
Harwood, Samuel E., State Normal University, Carbondale, Ill.
Hatch, W. H., Superintendent of Schools, Oak Park, Ill.
Henderson, Harmon C., State Normal School, Milwaukee, Wis.
Hicks, Warren E., Assistant Superintendent of Schools, Cleveland, Ohio
Hill, Patty Smith, Teachers College, New York City
Holmes, Manfred J., Illinois State Normal University, Normal, Ill.
Horn, Paul Whitfield, Superintendent of Schools, Houston, Tex.

Jeffers, Fred A., Superintendent of Schools, Painsdale, Mich.
Jenks, Jeremiah W., Cornell University, Ithaca, N.Y.
Johnson, Pliny, Woodward High School, Cincinnati, Ohio
Jones, Lewis H., President of State Normal College, Ypsilanti, Mich.
Judd, Charles H., University of Chicago, Chicago, Ill.
Keating, J. F., Superintendent of Schools, Pueblo, Colo.
Kirk, John R., President of State Normal School, Kirksville, Mo.
Kirk, W. H., Superintendent of Schools, East Cleveland, Ohio
Kraus-Boelti, Mrs. Maria, Hotel San Remo, Central Park, West 74th and 75th Sts., New York City
Lawrence, Isabel, State Normal School, St. Cloud, Minn.
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Mackey, E., Superintendent of Schools, Trenton, N.J.
Manny, Frank A., State Normal School, Kalamazoo, Mich.
Marsh, J. T., Assistant State Superintendent of Schools, Charleston, W.Va.
Maxwell, Wm. H., Superintendent of Schools, New York City
McDaniel, C. M., Superintendent of Schools, Hammond, Ind.
McKenny, Charles, President of State Normal School, Milwaukee, Wis.
McMurry, Charles A., State Normal School, De Kalb, Ill.
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Miller, G. R., Greeley, Colo.
Miller, Irving E., Teachers College, Greeley, Colo.
Mills, Hariette M., New York University, Washington Square, New York City
Minnich, H. C., State Normal College, Oxford, Ohio
Morgan, O. S., Alfred University, Alfred, N.Y.
Newton, George A., Trinity University, Waxahachie, Tex.
Olin, A. S., State University, Lawrence, Kan.
O'Shea, M. V., University of Wisconsin, Madison, Wis.
Parker, S. Chester, University of Chicago, Chicago, Ill.
Pollack, Rosalie, Supervisor Primary Schools, Salt Lake City, Utah
Putnam, Helen C., Providence, R.I.
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Rosier, Joseph, Superintendent of Schools, Fairmont, W.Va.

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Russell, James E., Dean of Teachers College, New York City
Ruthrauff, W. M., Care Silver, Burdett & Co., 378 Wabash Ave., Chicago, Ill.
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Shoemaker, Waite A., State Normal School, St. Cloud, Minn.
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Snyder, Z. X., President State Normal School, Greeley, Colo.
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Thorndike, Edward L., Columbia University, New York City
Thurber, Charles H., Editor, Ginn & Co., Boston, Mass.
Travis, Clyde R., State Normal School, Mayville, N.D.
Updegraff, Harlan, Bureau of Education, Washington, D.C.
Vanderwalker, Nina C., State Normal School, Milwaukee, Wis.
Van Liew, C. C., President of State Normal School, Chico, Cal.
Van Sickle, Jas. H., Superintendent of Schools, Springfield, Mass.
Waldo, Dwight B., Western State Normal School, Kalamazoo, Mich.
Walker, Elmer W., Superintendent State School for the Deaf, Delavan, Wis.
Willison, Archibald C., Superintendent of Schools, Allegany Co., Cumberland, Md.
Work, Cree T., President of College of Industrial Arts, Denton, Tex.
Wright, Robert H., Teachers Training School, Greenville, N.C.
Youker, Henry S., 491 New York Ave., Oshkosh, Wis.

HONORARY MEMBER

Dewey, John, Columbia University, New York City